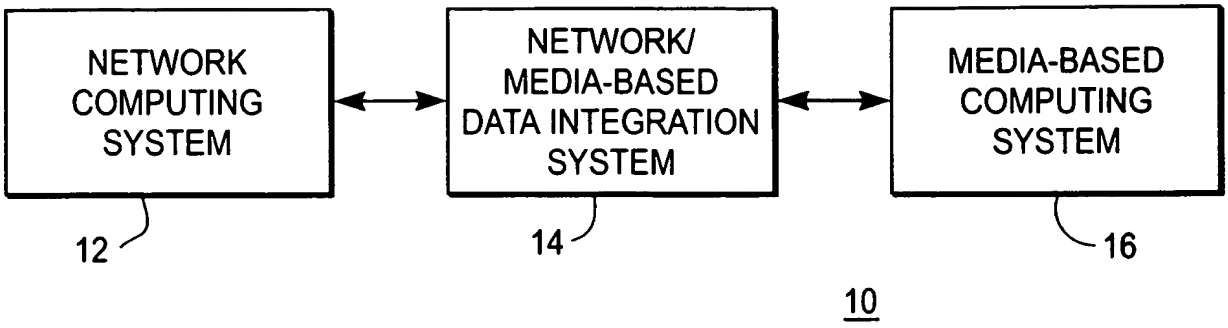

NETWORK COMPUTING SYSTEM
NETWORK/ MEDIA-BASED DATA INTEGRATION SYSTEM
MEDIA-BASED COMPUTING SYSTEM
12
14
16
10

FIG. 1A

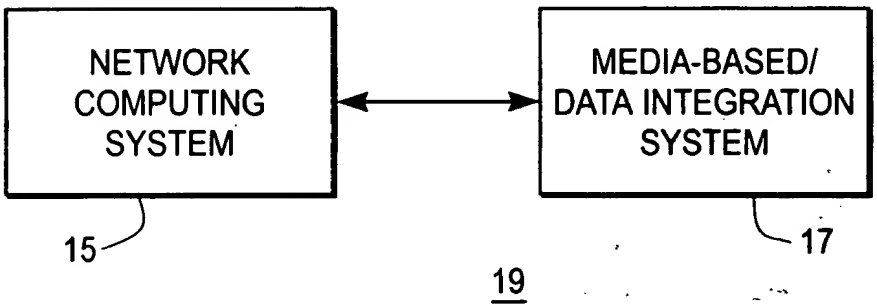

NETWORK COMPUTING SYSTEM
MEDIA-BASED/ DATA INTEGRATION SYSTEM
15
17
19

FIG. 1B

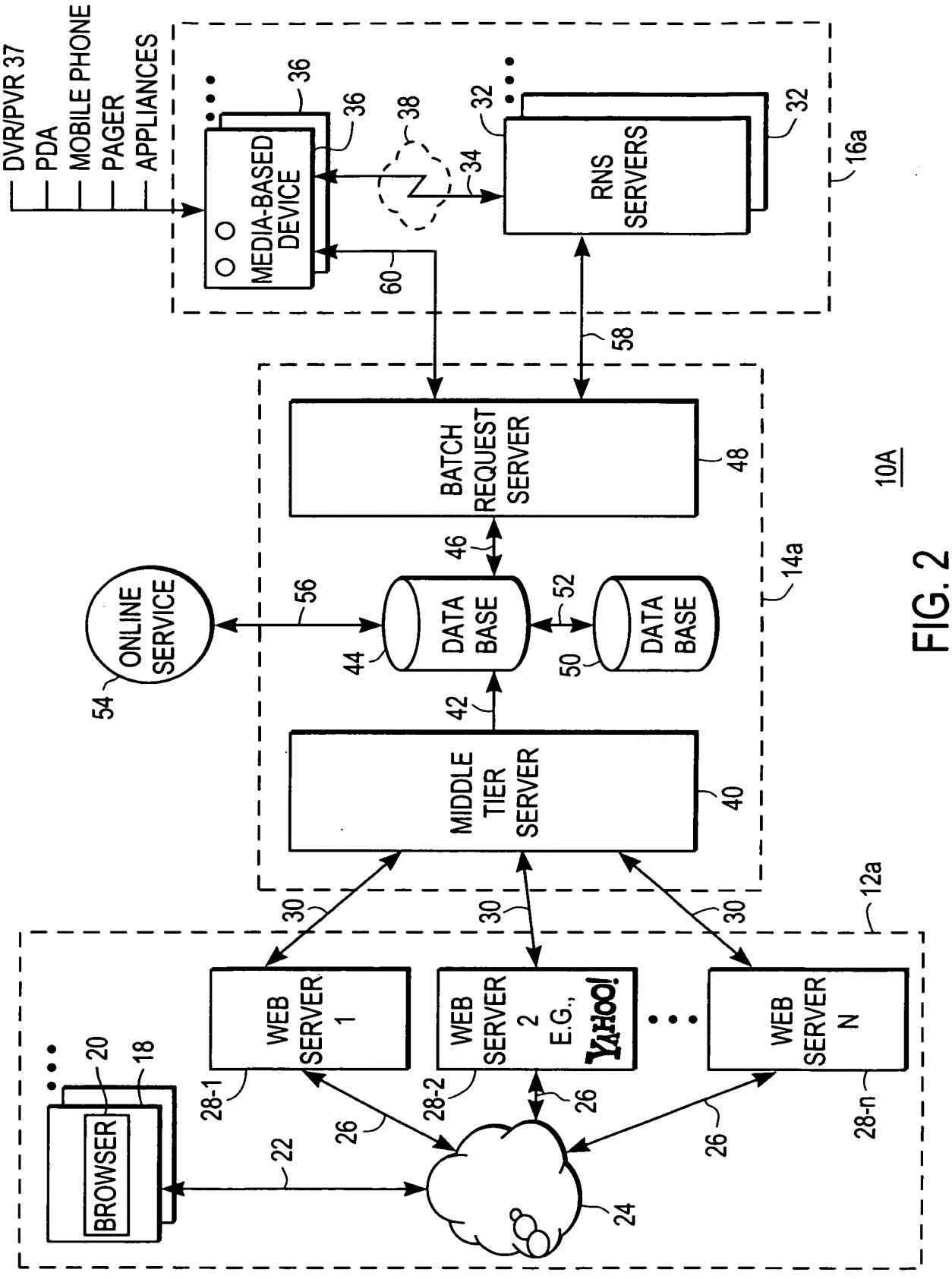

DVR/PVR 37
PDA
MOBILE PHONE
PAGER
APPLIANCES
MEDIA-BASED DEVICE
36
38
34
RNS SERVERS
32
16a
60
58
BATCH REQUEST SERVER
48
46
ONLINE SERVICE
54
56
DATA BASE
44
52
DATA BASE
50
14a
42
MIDDLE TIER SERVER
40
10A
30
12a
WEB SERVER 1
WEB SERVER 2 E.G., YAHOO!
WEB SERVER N
28-1
28-2
28-n
26
BROWSER
20
18
22
24

FIG. 2

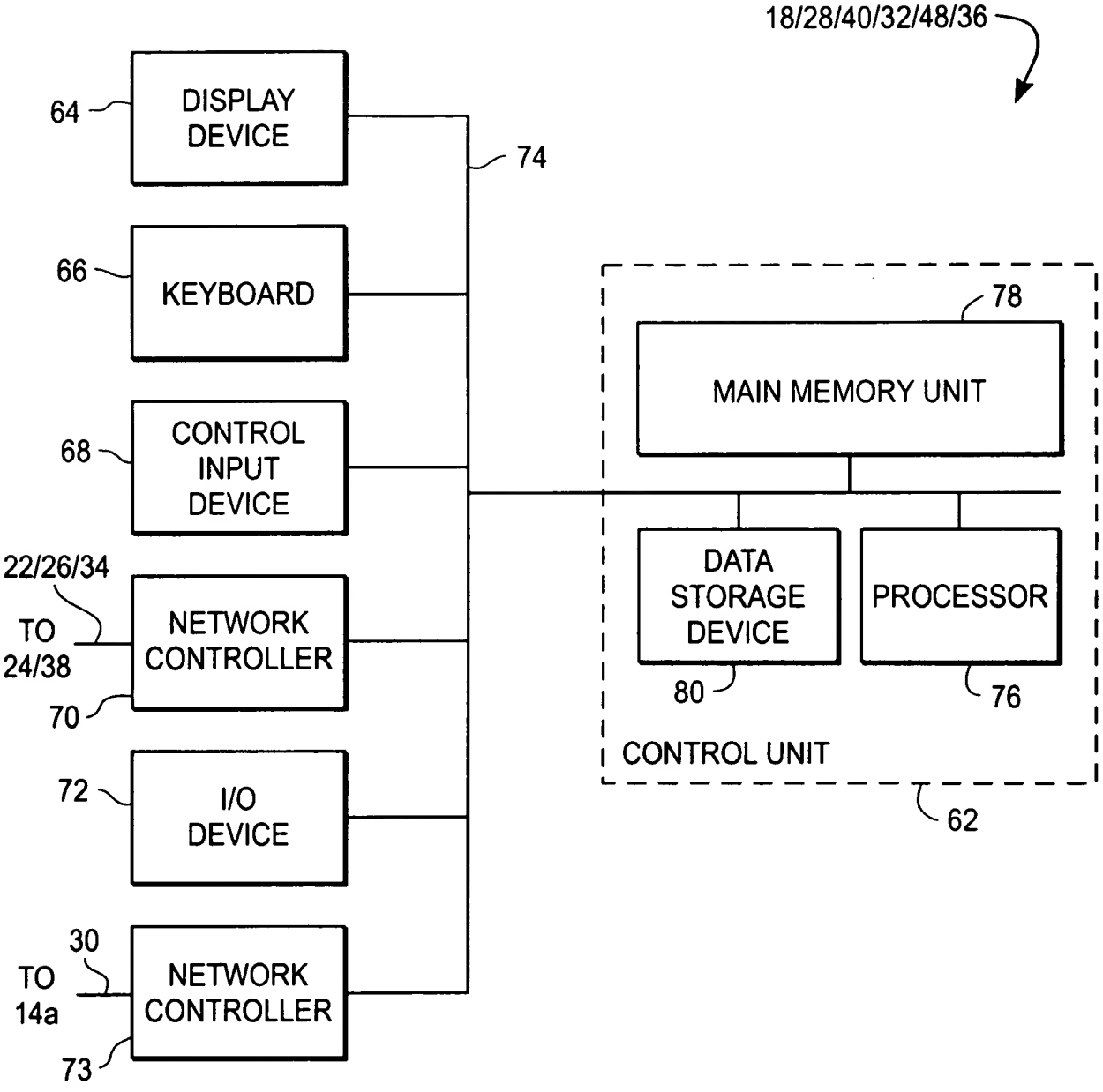

18/28/40/32/48/36
64
DISPLAY DEVICE
74
66
KEYBOARD
68
CONTROL INPUT DEVICE
22/26/34
TO 24/38
NETWORK CONTROLLER
70
72
I/O DEVICE
30
TO 14a
NETWORK CONTROLLER
73
78
MAIN MEMORY UNIT
DATA STORAGE DEVICE
80
PROCESSOR
76
CONTROL UNIT
62

FIG. 3

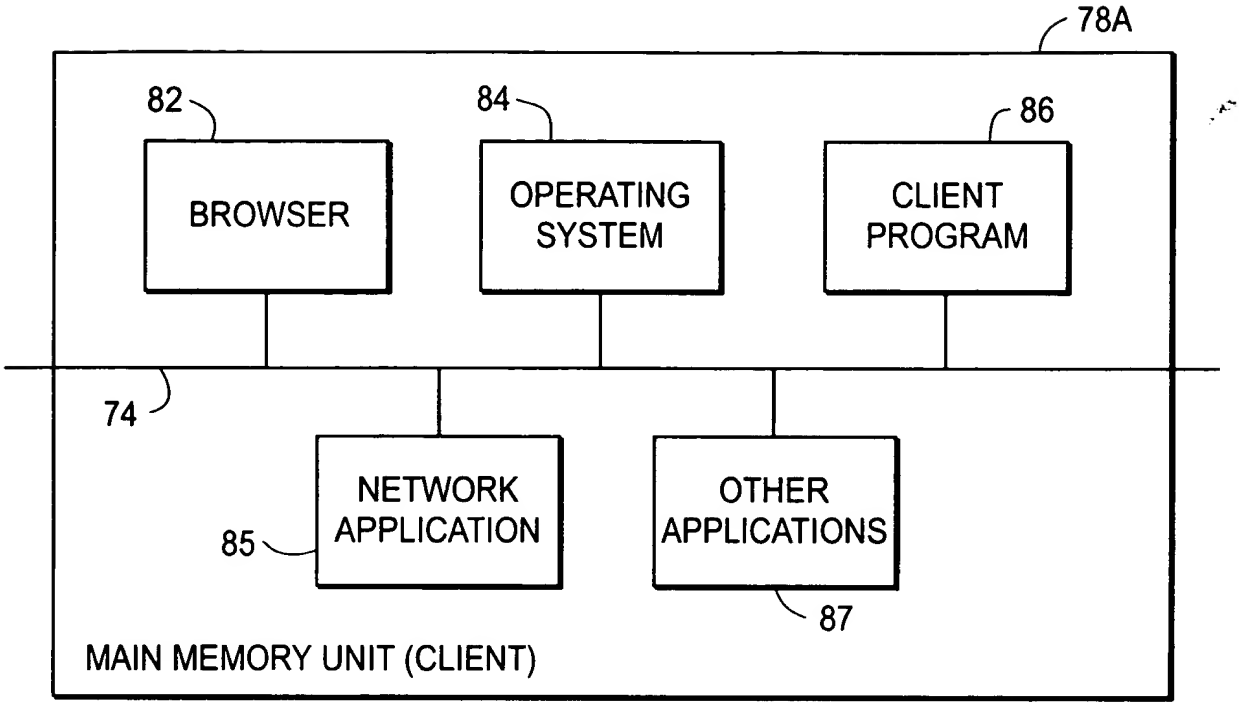

78A
82
BROWSER
84
OPERATING SYSTEM
86
CLIENT PROGRAM
74
85
NETWORK APPLICATION
OTHER APPLICATIONS
87
MAIN MEMORY UNIT (CLIENT)

FIG. 4A

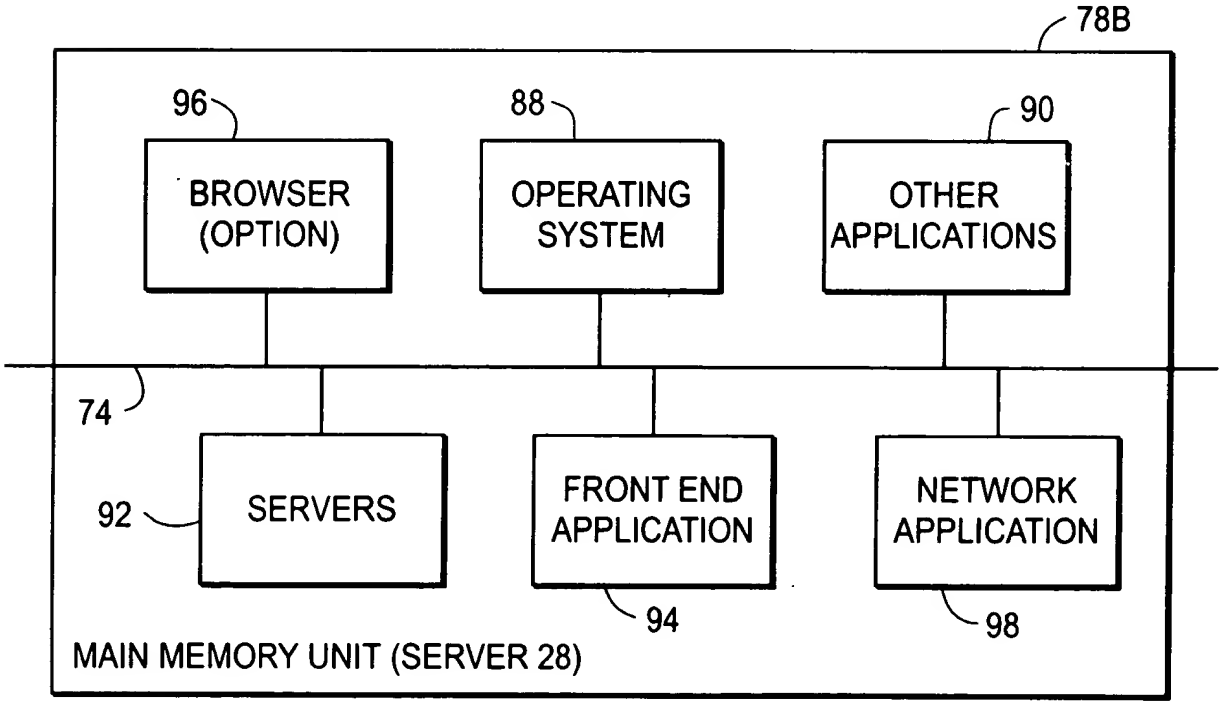

78B
96
BROWSER (OPTION)
88
OPERATING SYSTEM
90
OTHER APPLICATIONS
74
92
SERVERS
FRONT END APPLICATION
94
NETWORK APPLICATION
98
MAIN MEMORY UNIT (SERVER 28)

FIG. 4B

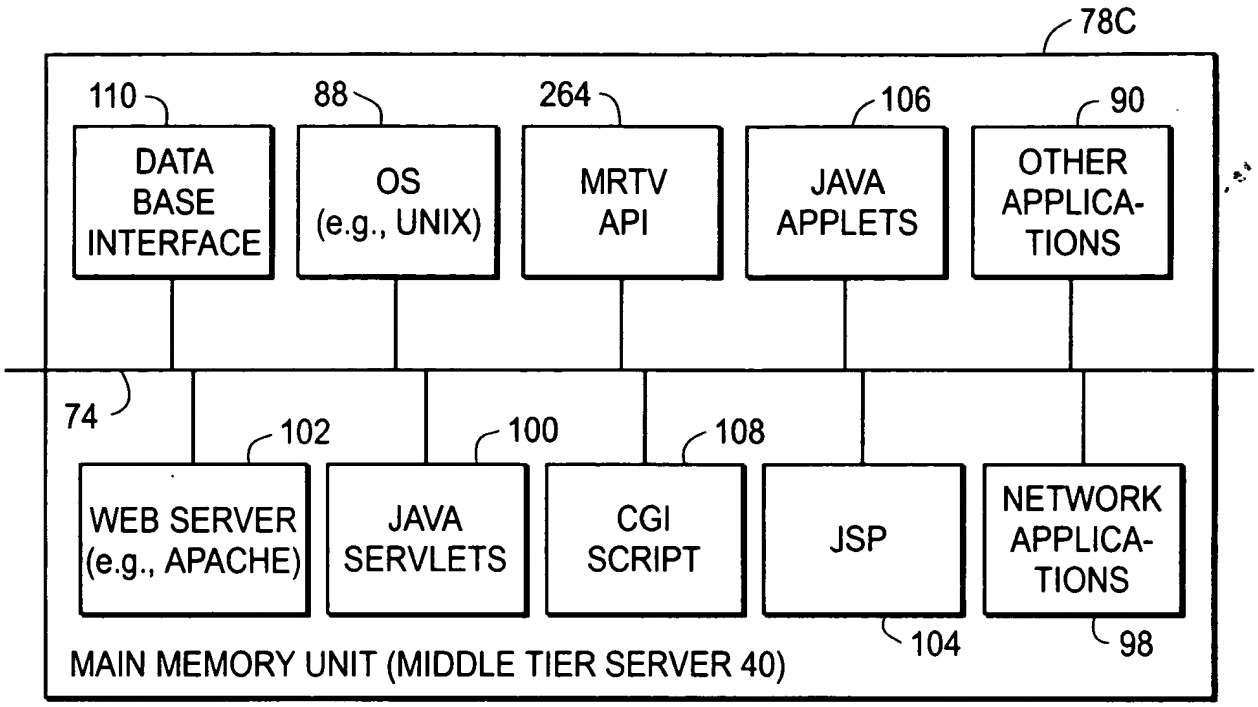

78C
110
DATA BASE INTERFACE
88
OS (e.g., UNIX)
264
MRTV API
106
JAVA APPLETS
90
OTHER APPLICA-TIONS
74
102
WEB SERVER (e.g., APACHE)
100
JAVA SERVLETS
108
CGI SCRIPT
JSP
104
NETWORK APPLICA-TIONS
98
MAIN MEMORY UNIT (MIDDLE TIER SERVER 40)

FIG. 4C

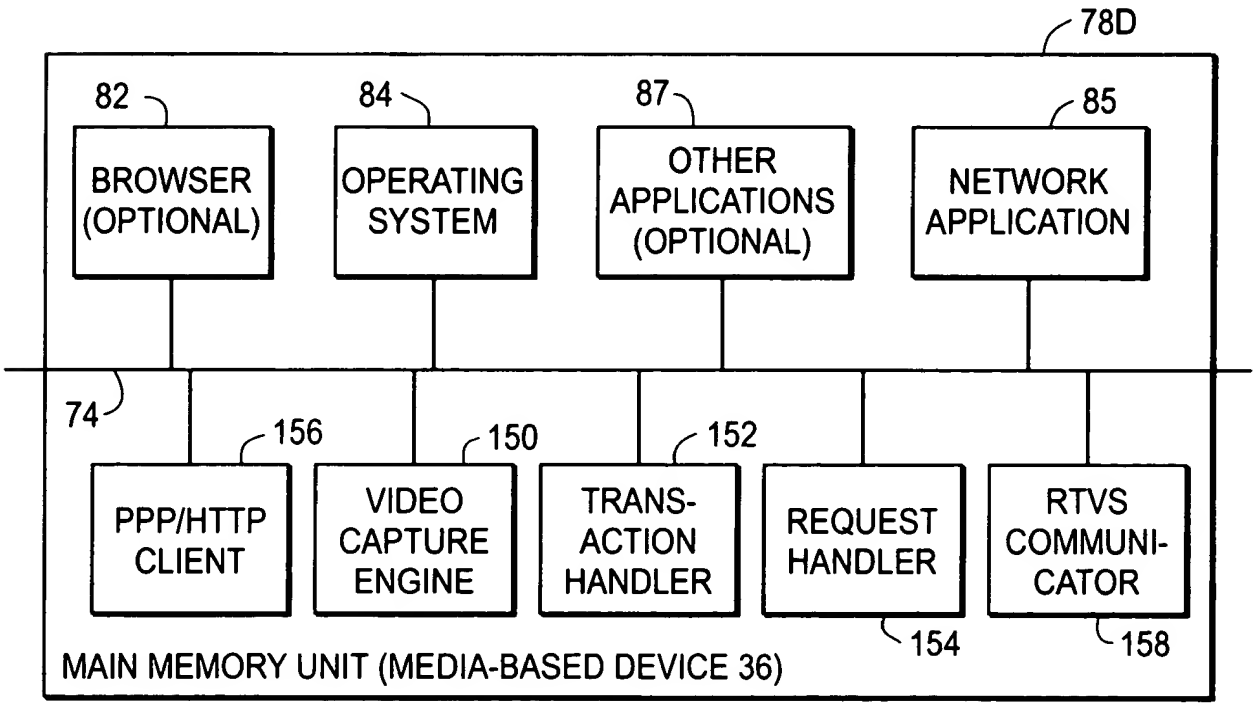

78D
82
BROWSER (OPTIONAL)
84
OPERATING SYSTEM
87
OTHER APPLICATIONS (OPTIONAL)
85
NETWORK APPLICATION
74
156
PPP/HTTP CLIENT
150
VIDEO CAPTURE ENGINE
152
TRANS-ACTION HANDLER
REQUEST HANDLER
154
RTVS COMMUNI-CATOR
158
MAIN MEMORY UNIT (MEDIA-BASED DEVICE 36)

FIG. 4D

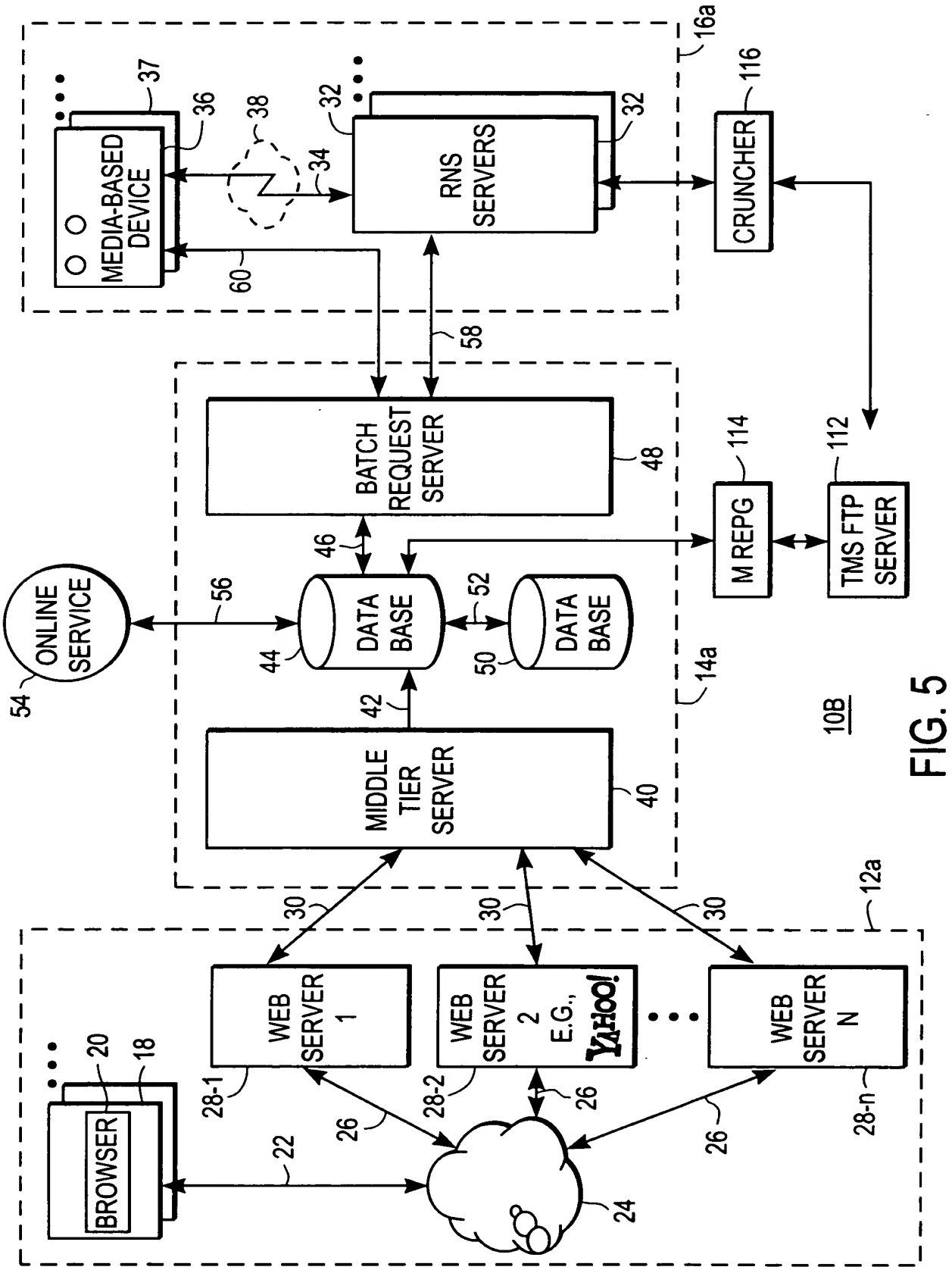

16a
MEDIA-BASED DEVICE
37
36
38
34
32
RNS SERVERS
32
CRUNCHER
116
60
58
BATCH REQUEST SERVER
48
114
M REPG
112
TMS FTP SERVER
ONLINE SERVICE
54
56
46
DATA BASE
44
52
DATA BASE
50
14a
42
MIDDLE TIER SERVER
40
10B
30
30
30
12a
WEB SERVER 1
WEB SERVER 2 E.G., YAHOO!
WEB SERVER N
20
18
BROWSER
28-1
28-2
28-n
26
26
26
22
24

FIG. 5

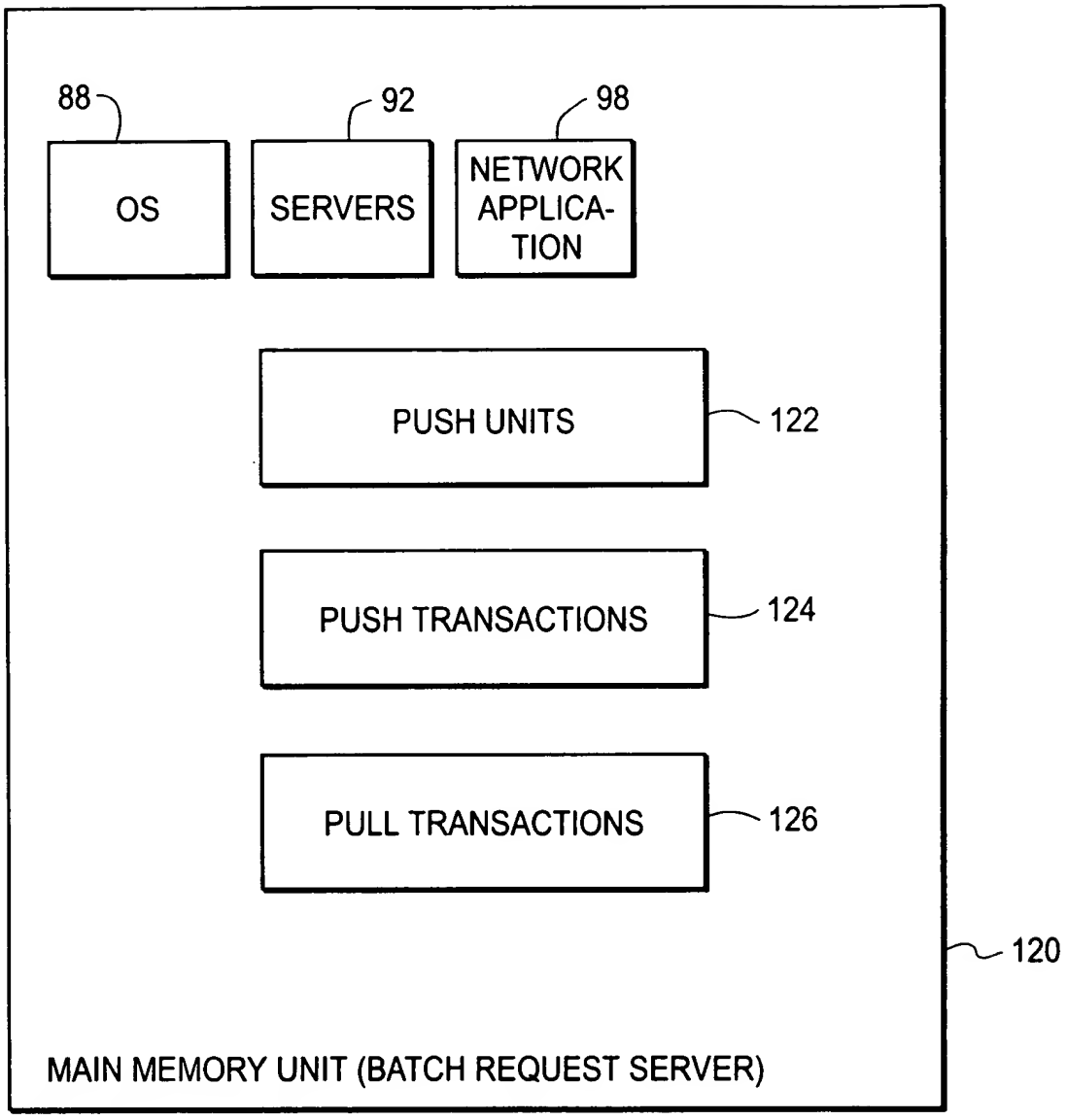

88
92
98
OS
SERVERS
NETWORK APPLICA-TION
PUSH UNITS
122
PUSH TRANSACTIONS
124
PULL TRANSACTIONS
126
120
MAIN MEMORY UNIT (BATCH REQUEST SERVER)

FIG. 6

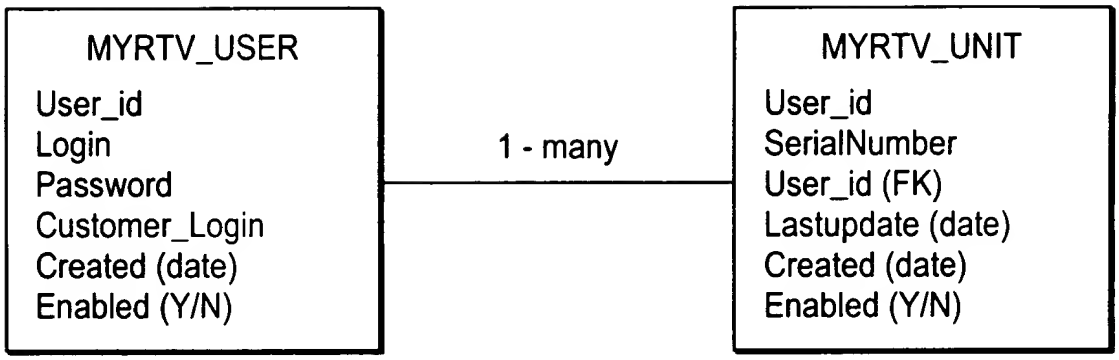

MYRTV_USER
User_id
Login
Password
Customer_Login
Created (date)
Enabled (Y/N)
1 - many
MYRTV_UNIT
User_id
SerialNumber
User_id (FK)
Lastupdate (date)
Created (date)
Enabled (Y/N)

FIG. 7

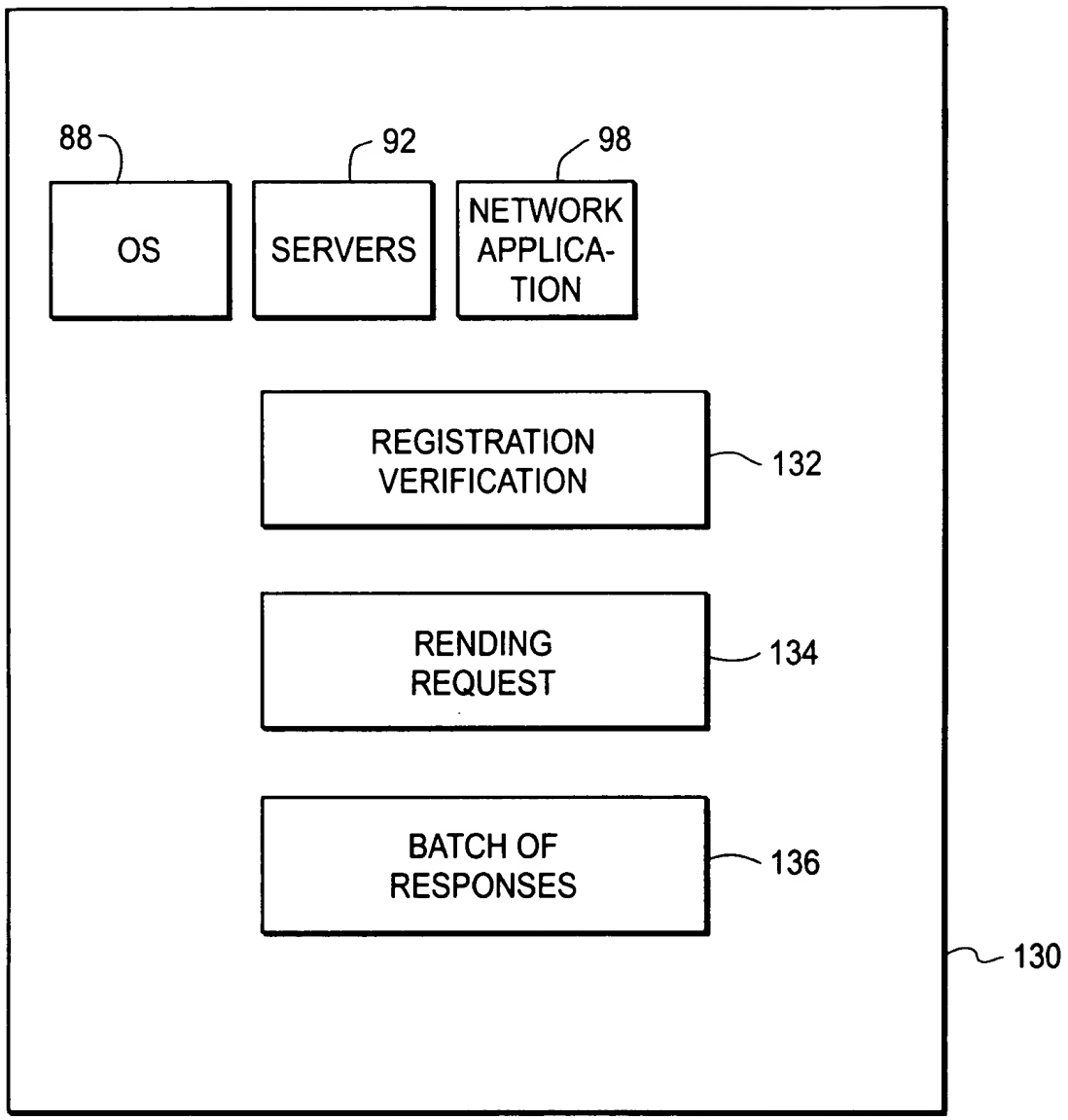

88
92
98
OS
SERVERS
NETWORK APPLICA-TION
REGISTRATION VERIFICATION
132
RENDING REQUEST
134
BATCH OF RESPONSES
136
130

FIG. 8

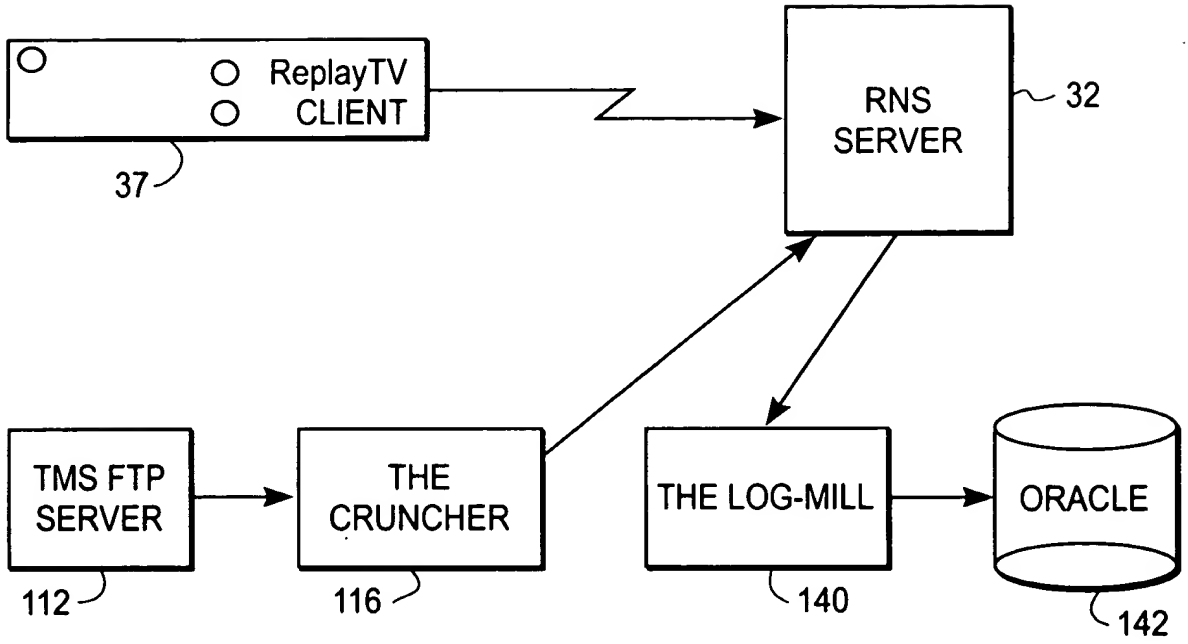

ReplayTV
CLIENT
37
RNS
SERVER
32
TMS FTP
SERVER
112
THE
CRUNCHER
116
THE LOG-MILL
140
ORACLE
142

FIG. 9

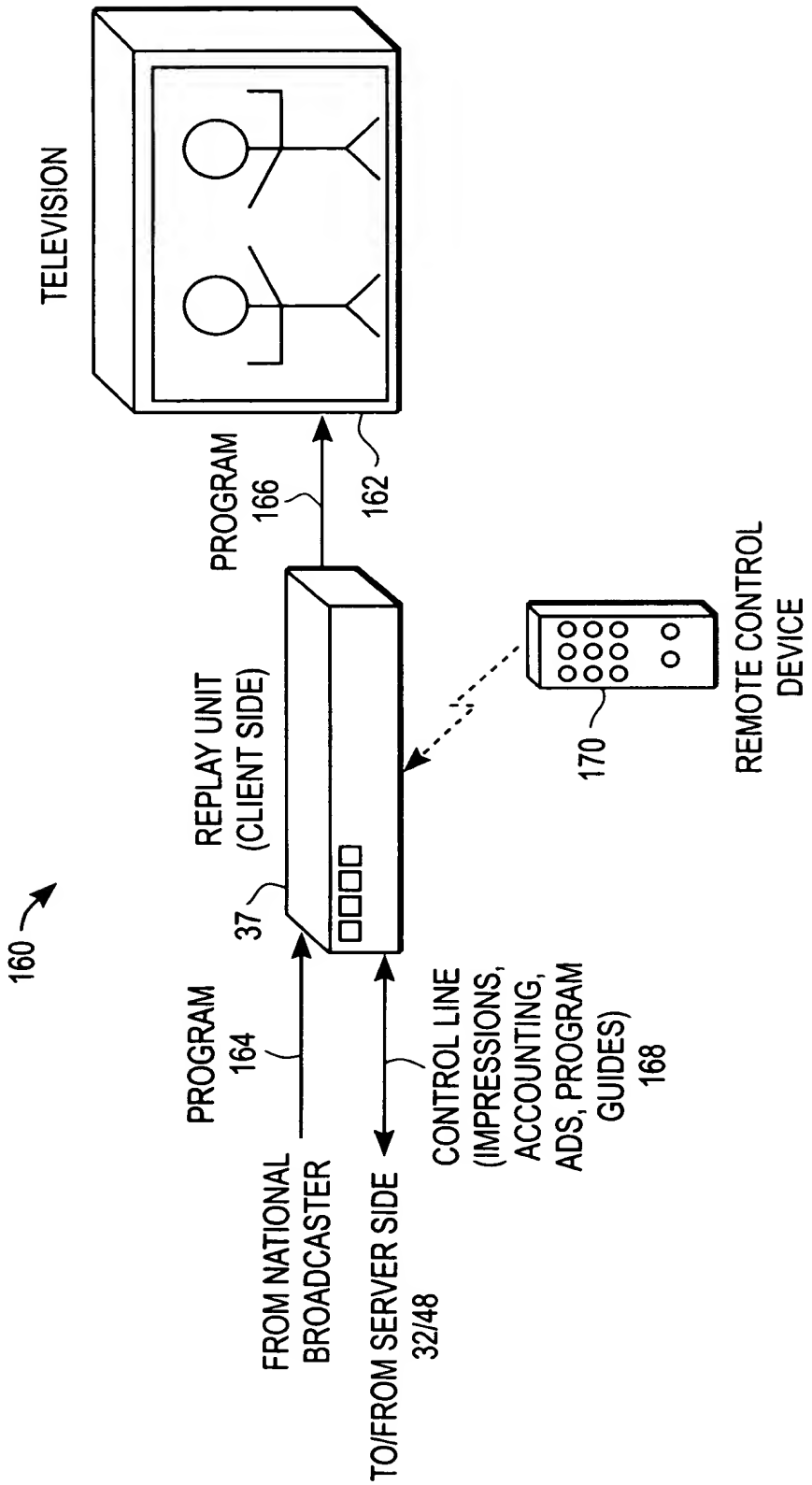

TELEVISION
PROGRAM
166
162
REPLAY UNIT
(CLIENT SIDE)
37
160
REMOTE CONTROL
DEVICE
170
PROGRAM
164
FROM NATIONAL
BROADCASTER
CONTROL LINE
(IMPRESSIONS,
ACCOUNTING,
ADS, PROGRAM
GUIDES)
168
TO/FROM SERVER SIDE
32/48

FIG. 10

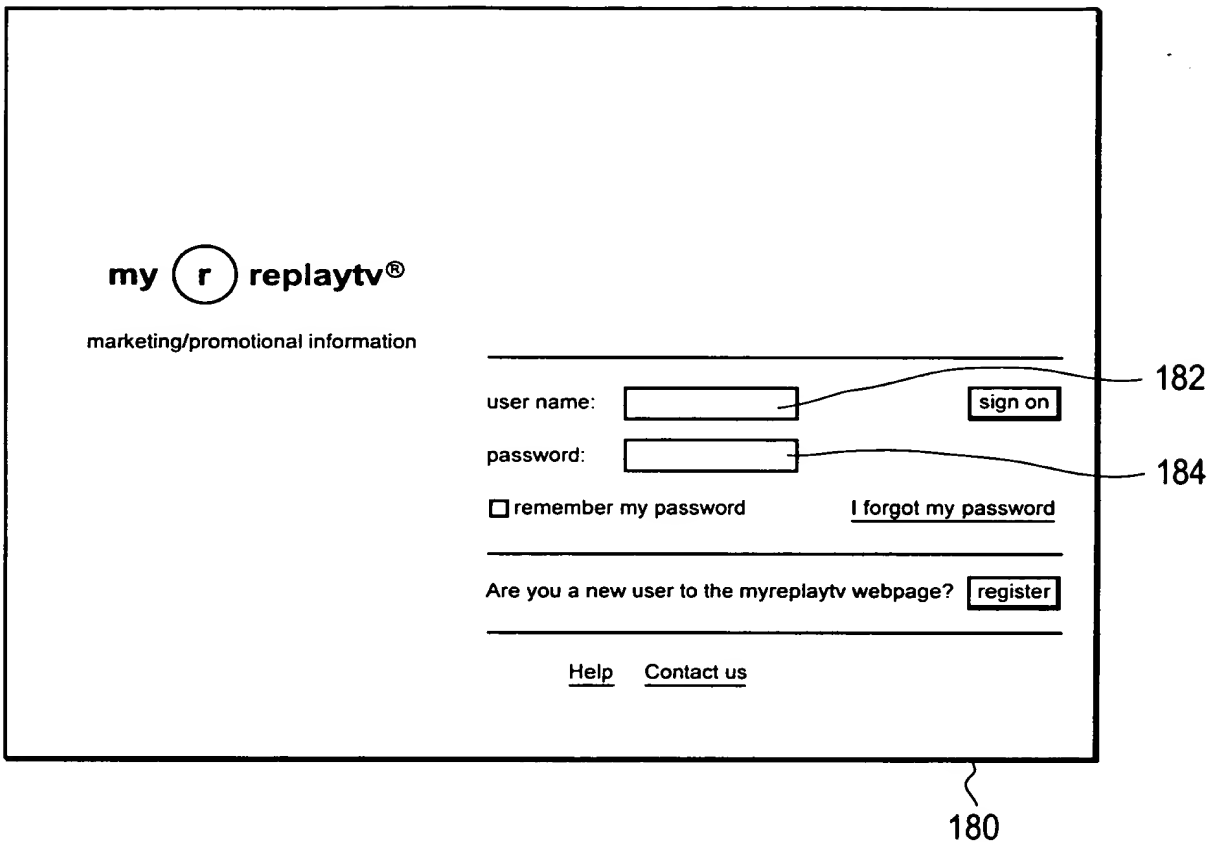

my r replaytv®
marketing/promotional information
user name:
sign on
password:
remember my password
I forgot my password
Are you a new user to the myreplaytv webpage?
register
Help
Contact us
182
184
180

FIG. 11

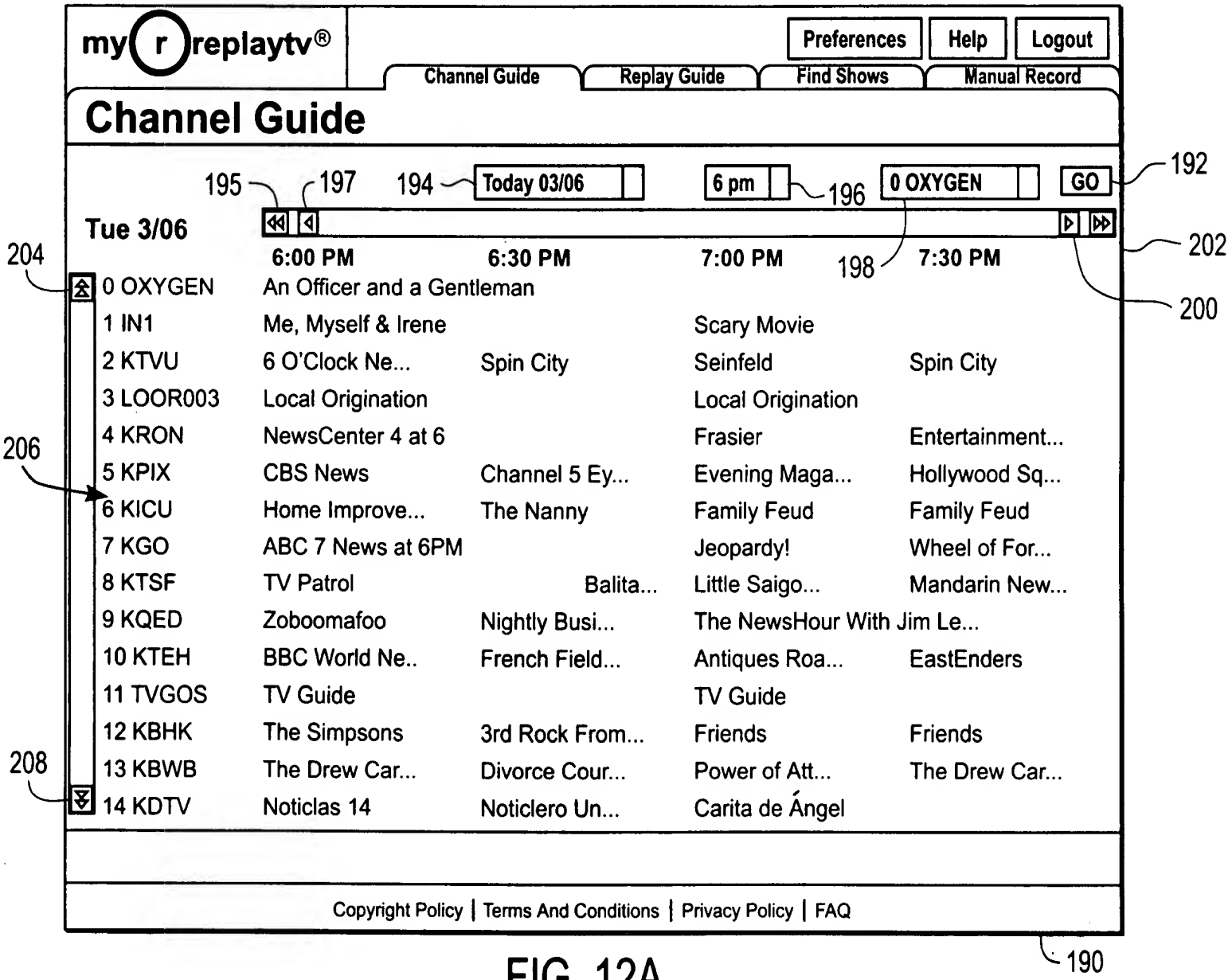


FIG. 12A

Title: One Click Web Records
Applicants: Chris E. Matichuk and Scott A. Rosenberg
Docket No.: 22407-05676US

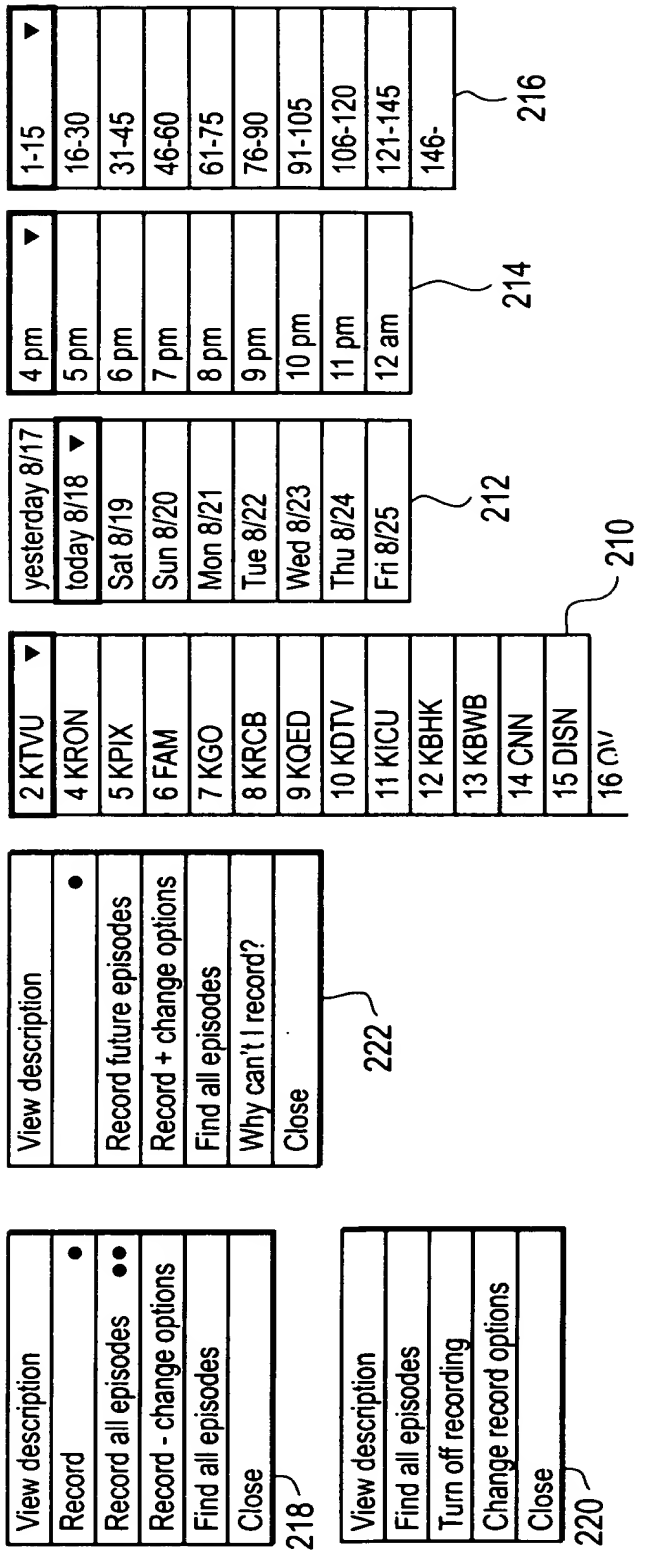

View description
Record
Record all episodes
Record - change options
Find all episodes
Close
218
View description
Find all episodes
Turn off recording
Change record options
Close
220
View description
Record future episodes
Record + change options
Find all episodes
Why can't I record?
Close
222
2 KTVU
4 KRON
5 KPIX
6 FAM
7 KGO
8 KRCB
9 KQED
10 KDTV
11 KICU
12 KBHK
13 KBWB
14 CNN
15 DISN
16 ON
210
yesterday 8/17
today 8/18
Sat 8/19
Sun 8/20
Mon 8/21
Tue 8/22
Wed 8/23
Thu 8/24
Fri 8/25
212
4 pm
5 pm
6 pm
7 pm
8 pm
9 pm
10 pm
11 pm
12 am
214
1-15
16-30
31-45
46-60
61-75
76-90
91-105
106-120
121-145
146-
216

FIG. 12B

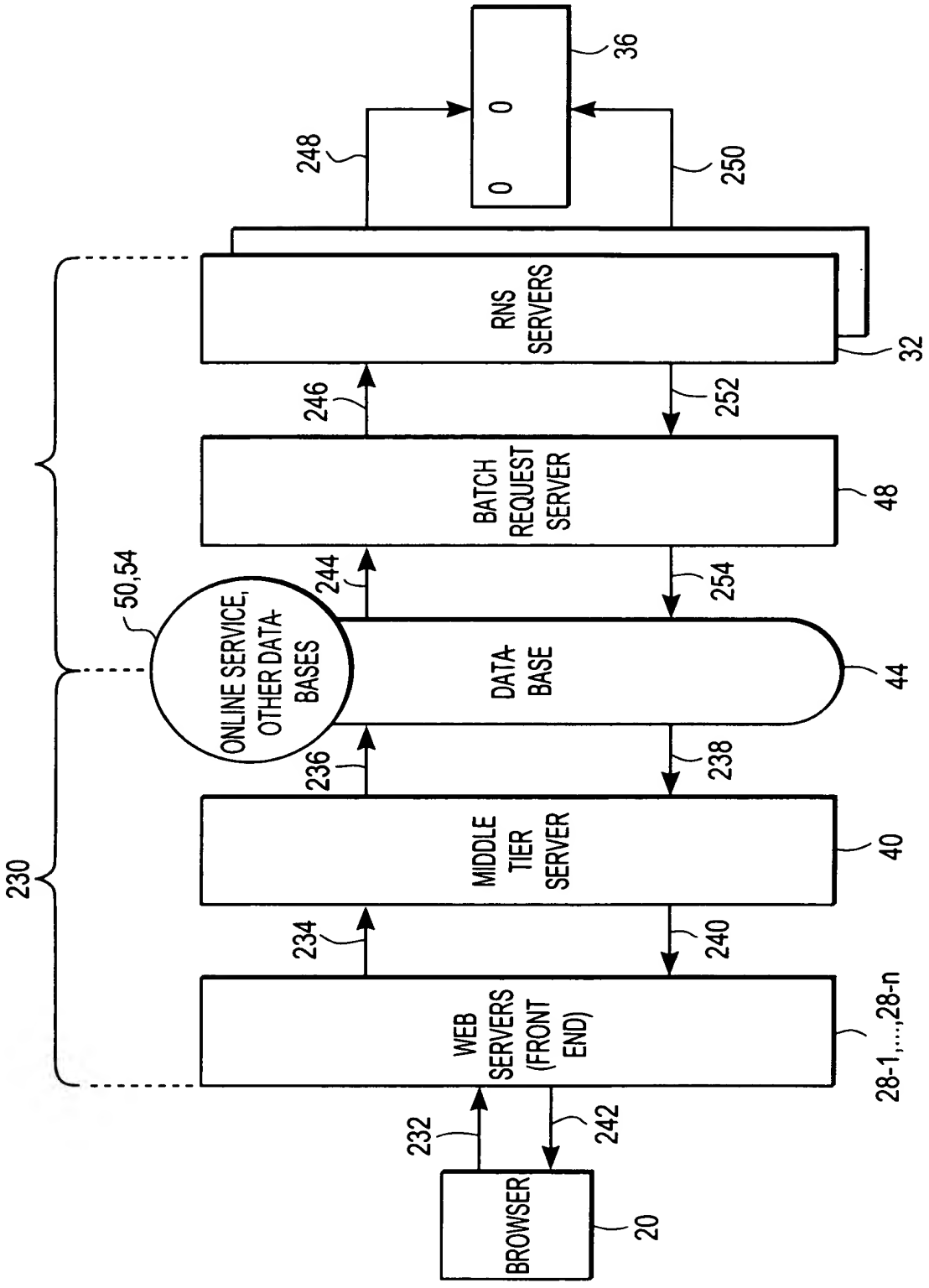

0
0
0
36
248
250
RNS SERVERS
32
246
252
BATCH REQUEST SERVER
48
50,54
244
254
ONLINE SERVICE, OTHER DATA-BASES
DATA-BASE
44
236
238
MIDDLE TIER SERVER
40
230
234
240
WEB SERVERS (FRONT END)
28-1,...,28-n
232
242
BROWSER
20

FIG. 13A

SEQUENCE DIAGRAM

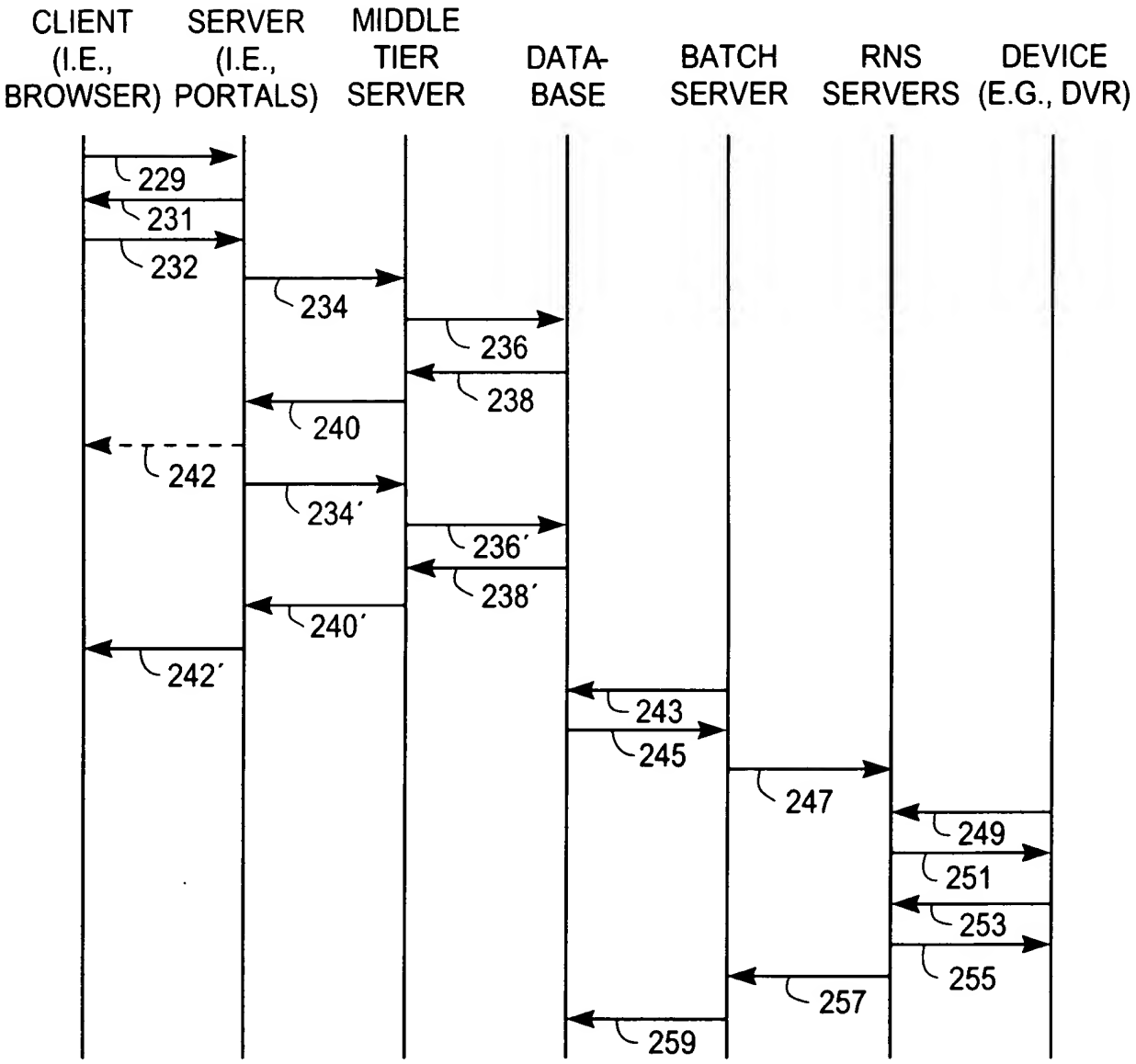


FIG. 13B

API Routine	Function
CreateAccount	Creates an account for a new user based on the information received
Login	Tries to authenticate a user based on the input username and password combination
GetProfile	Returns the profile of the user and his units based on his userid
AddRequest	Adds a request to the unit's list of pending requests based on a set of request parameters, and returns the full status of the unit and of the pending requests, including those for recording specific show(s) and deleting recorded show(s)
DeleteRequest	Delete a request from the user list of pending requests
GetReplayGuide	Returns the Replay Guide of the unit as saved in the appropriate database for the specified unit
GetChannelLineUp	Returns the channel lineup of the unit based on the unit's settings
ChangePassword	Lets the user change his password
GetEPG	Returns the current electronic program guide for the unit based on the settings of the unit
ShowGuide	Returns detailed information about a specified show or search show details for particular shows based on criteria given as parameters

FIG. 14

API Routine	Input Parameters	Output Files (Corresponding XML Elements)
CreateAccount	firstname, lastname, address1, address2, city, state,zipcode, serial number, login, password, creator	ACCOUNT.XML REPLAYERROR.XML
Login	login, password	ACCOUNT.XML REPLAYERROR.XML
GetProfile	userid	PROFILE.XML (USERINFO, UNITINFO-I) REPLAYERROR.XML
AddRequest	usereid, unitid, reqtype(none, show, theme, update) reqtype=show: showtime(single, repeat, manual single, manual repeat), headendid, tmsid, device, starttimegmt, name, durationinminutes, inputsource, quality, guaranteedrecord, numepisodes, weekdayflags, earlystartminutes, showguarminutes reqtyp=theme: searchterm, searchflags, suzuklid, durationinminutes, quality, guaranteedrecord reqtype=update: updatetype(deleteshow, preserveshow, deletechannel), channelid, showid	UNITSTATUS.XML (UNITINFO, REQUESTSTATUS-I) REPLAYERROR.XML *Note: REQUESTSTATUS Result:=(PENDING, SENT, SUCCESS, GENERAL FAILURE, SCHEDULEFAILURE, ROOMFAILURE)
DeleteRequest	userid, unitid, requestid	DELETERESULT.XML, REPLAYERROR.XML
GetReplayGuide	userid, unitid	GUIDE.XML (REPLAYCHANNEL-I), REPLAYERROR.XML *Note: REPLAYCHANNEL Type:=(SINGLE, SINGLEMANUAL, REPEAT, REPEATMANUAL, THEME, THEMEEXACT, ZONE)
GetChannelLineUp	userid, unitid	CHANNELLINEUP.XML (CHANNEL-I), REPLAYERROR.XML
ChangePassword	userid, currentpassword, newpassword	ACCOUNT.XML, REPLAYERROR.XML
GetEPG	userid, unitid, starttimegmt, durationinminutes, startchannel, channelcount	XML file based on tvguide.dtd & tvprograms.dtd REPLAYERROR.XML
ShowGuide	userid, unitid, query, start, count,levelofdetail *Note: query keywords include actor, advisory, desc, mpaarating, title, etc.	XML file based on tvguide.dtd & tvprograms.dtd REPLAYERROR.XML

FIG. 15

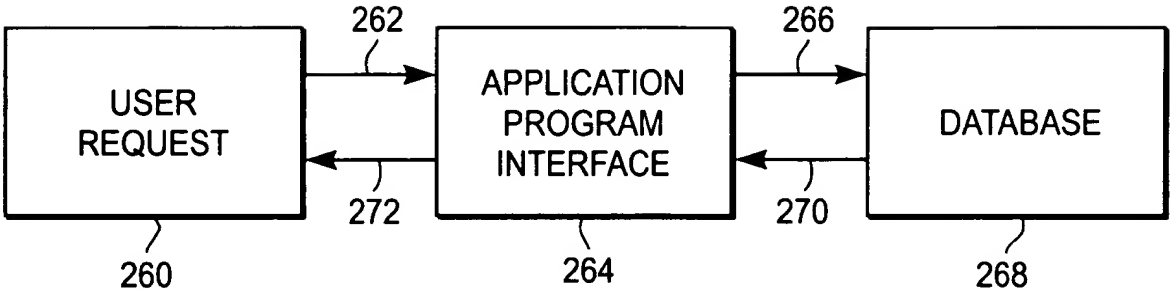

USER REQUEST
APPLICATION PROGRAM INTERFACE
DATABASE
262
266
272
270
260
264
268

FIG. 16A

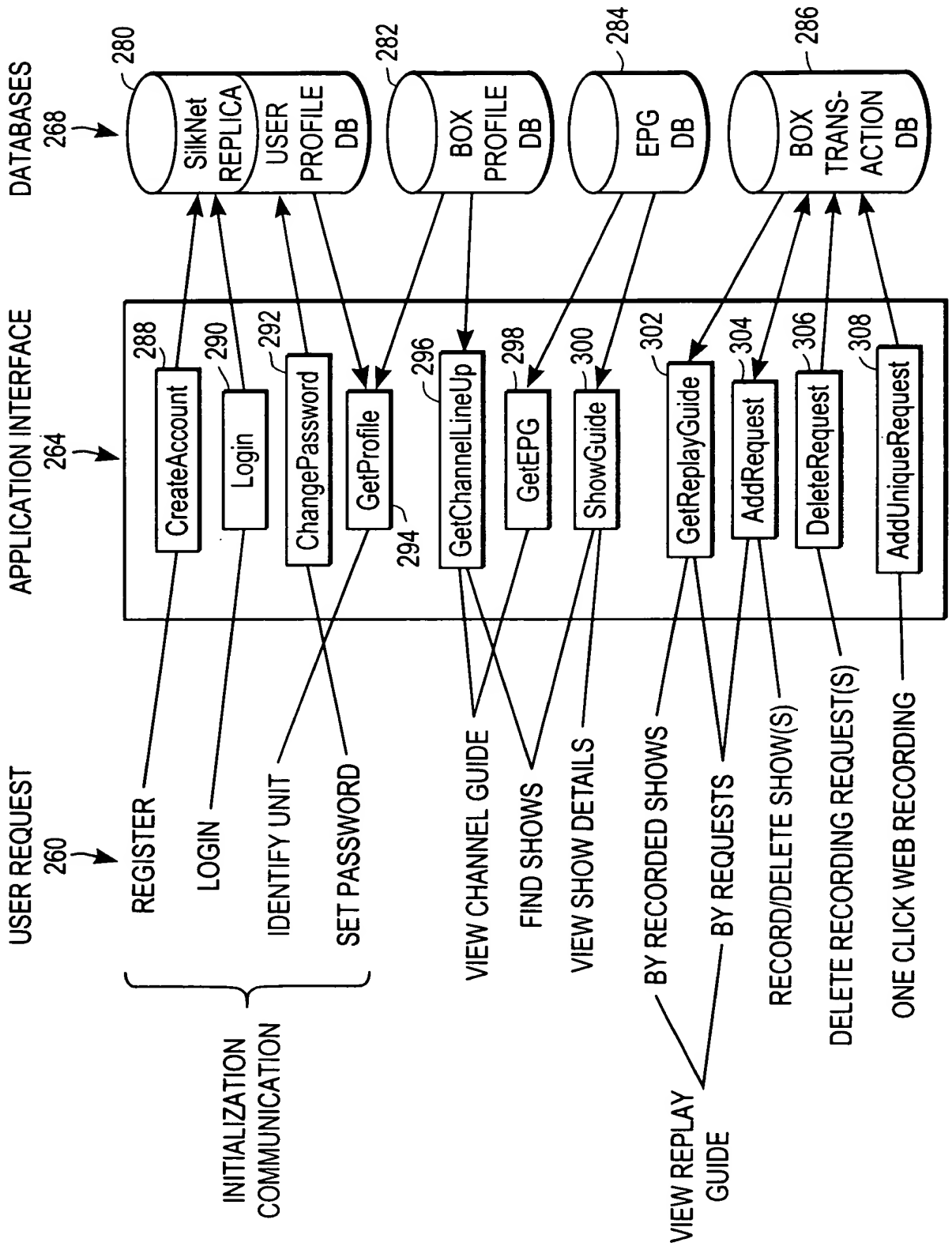

DATABASES
268
280
SilkNet REPLICA
USER PROFILE DB
282
BOX PROFILE DB
284
EPG DB
286
BOX TRANS-ACTION DB
APPLICATION INTERFACE
264
288
CreateAccount
290
Login
292
ChangePassword
GetProfile
294
296
GetChannelLineUp
298
GetEPG
300
ShowGuide
302
GetReplayGuide
304
AddRequest
306
DeleteRequest
308
AddUniqueRequest
USER REQUEST
260
REGISTER
LOGIN
IDENTIFY UNIT
SET PASSWORD
INITIALIZATION COMMUNICATION
VIEW CHANNEL GUIDE
FIND SHOWS
VIEW SHOW DETAILS
BY RECORDED SHOWS
BY REQUESTS
VIEW REPLAY GUIDE
RECORD/DELETE SHOW(S)
DELETE RECORDING REQUEST(S)
ONE CLICK WEB RECORDING

FIG. 16B

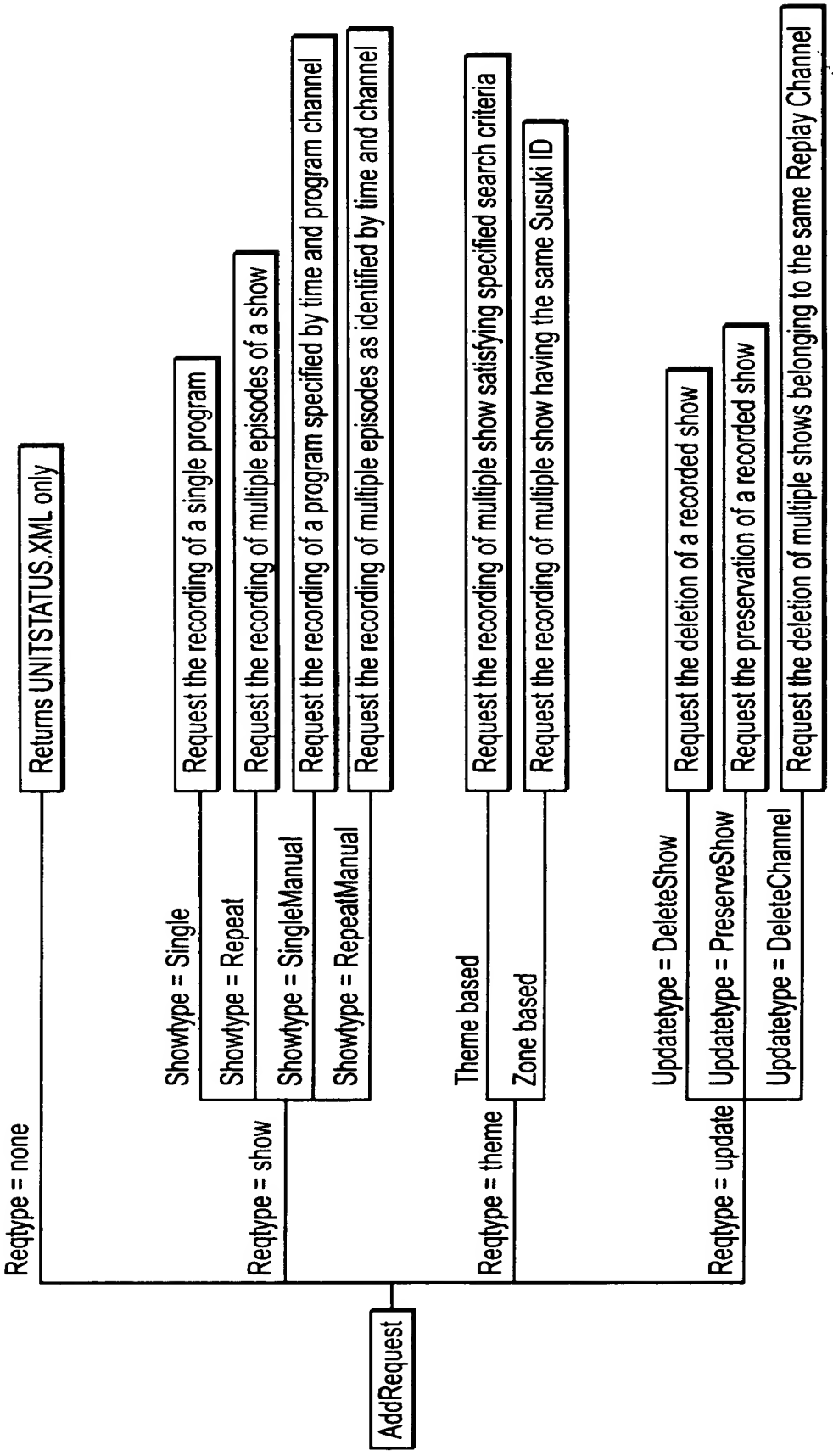
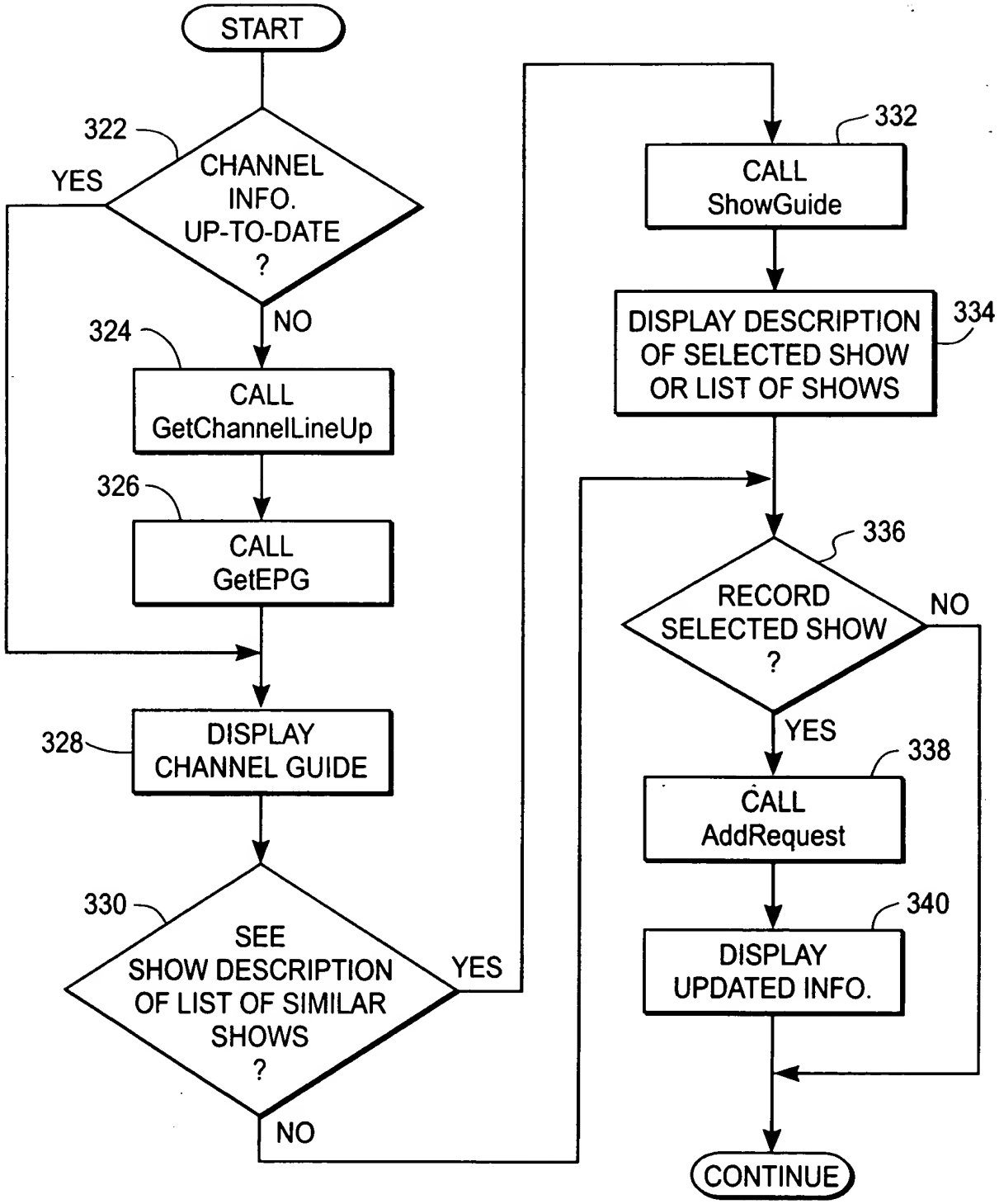

AddRequest
Reqtype = none
Returns UNITSTATUS.XML only
Reqtype = show
Showtype = Single
Request the recording of a single program
Showtype = Repeat
Request the recording of multiple episodes of a show
Showtype = SingleManual
Request the recording of a program specified by time and program channel
Showtype = RepeatManual
Request the recording of multiple episodes as identified by time and channel
Reqtype = theme
Theme based
Request the recording of multiple show satisfying specified search criteria
Zone based
Request the recording of multiple show having the same Susuki ID
Reqtype = update
Updatetype = DeleteShow
Request the deletion of a recorded show
Updatetype = PreserveShow
Request the preservation of a recorded show
Updatetype = DeleteChannel
Request the deletion of multiple shows belonging to the same Replay Channel

FIG. 17


START
322
CHANNEL INFO. UP-TO-DATE ?
YES
NO
324
CALL GetChannelLineUp
326
CALL GetEPG
328
DISPLAY CHANNEL GUIDE
330
SEE SHOW DESCRIPTION OF LIST OF SIMILAR SHOWS ?
YES
NO
332
CALL ShowGuide
334
DISPLAY DESCRIPTION OF SELECTED SHOW OR LIST OF SHOWS
336
RECORD SELECTED SHOW ?
NO
YES
338
CALL AddRequest
340
DISPLAY UPDATED INFO.
CONTINUE

320

FIG. 18

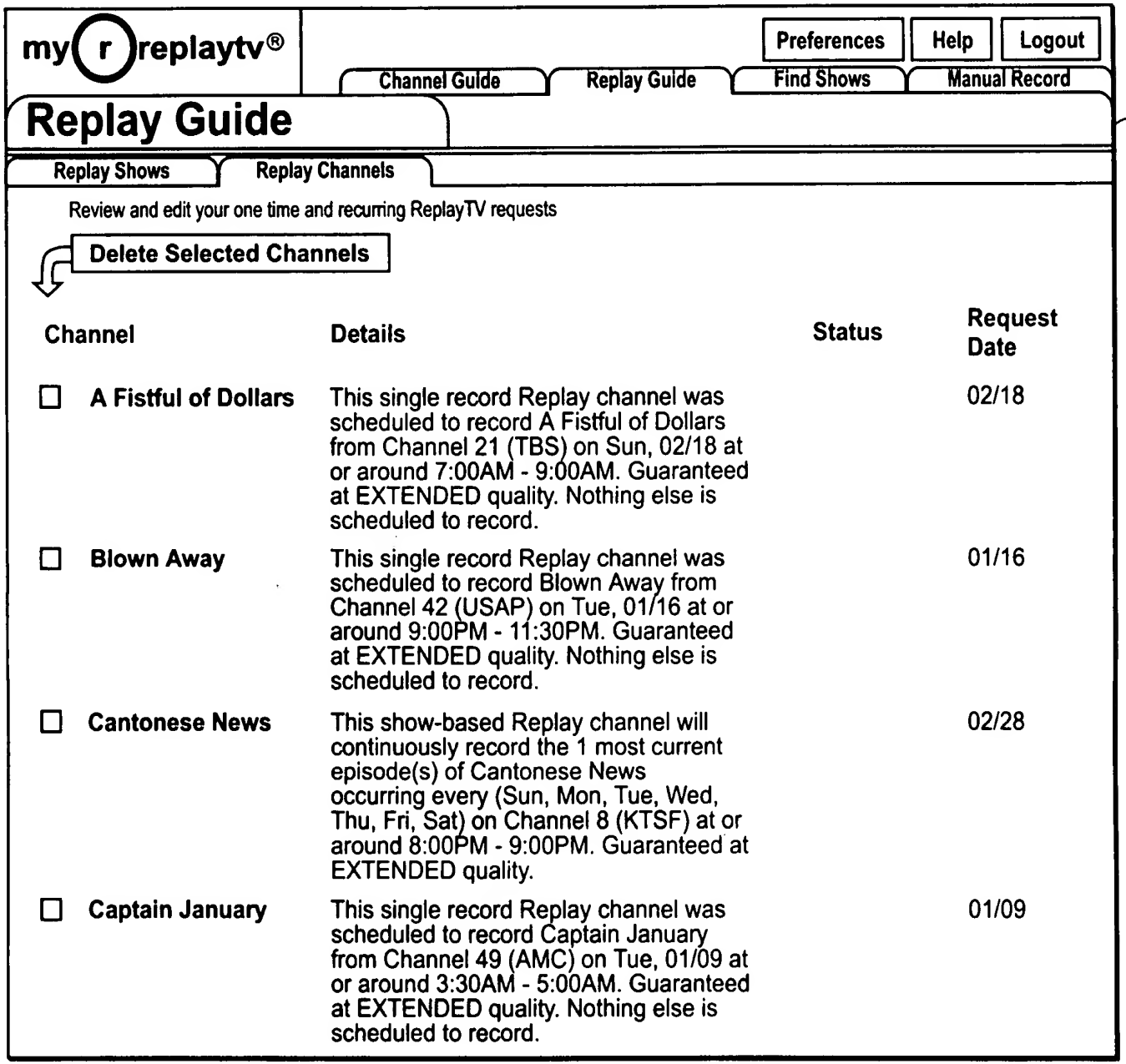


FIG. 19A

Title: One Click Web Records
Applicants: Chris E. Matichuk and Scott A. Rosenberg
Docket No.: 22407-05676US

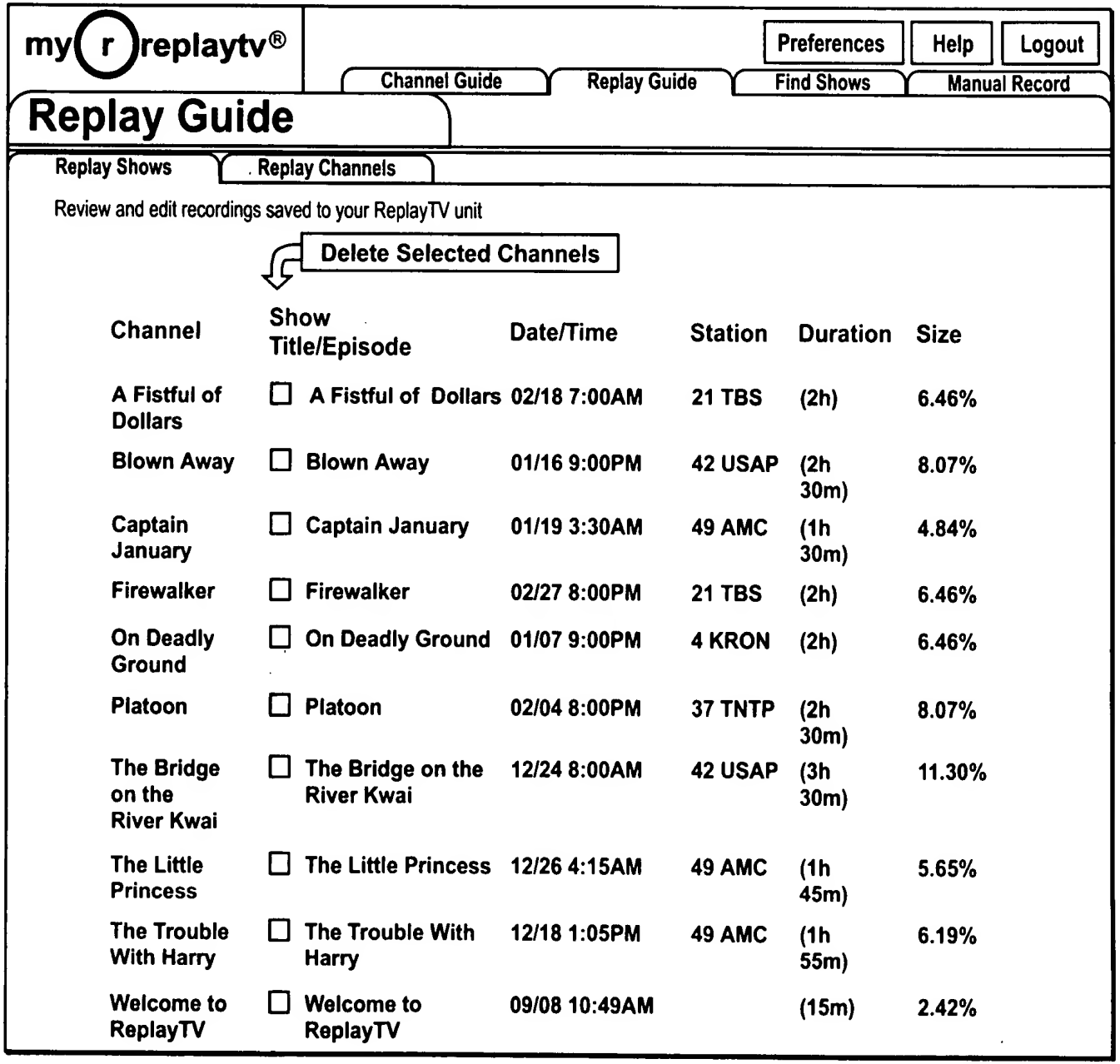


FIG. 19B

Title: One Click Web Records
Applicants: Chris E. Matichuk and Scott A. Rosenberg
Docket No.: 22407-05676US

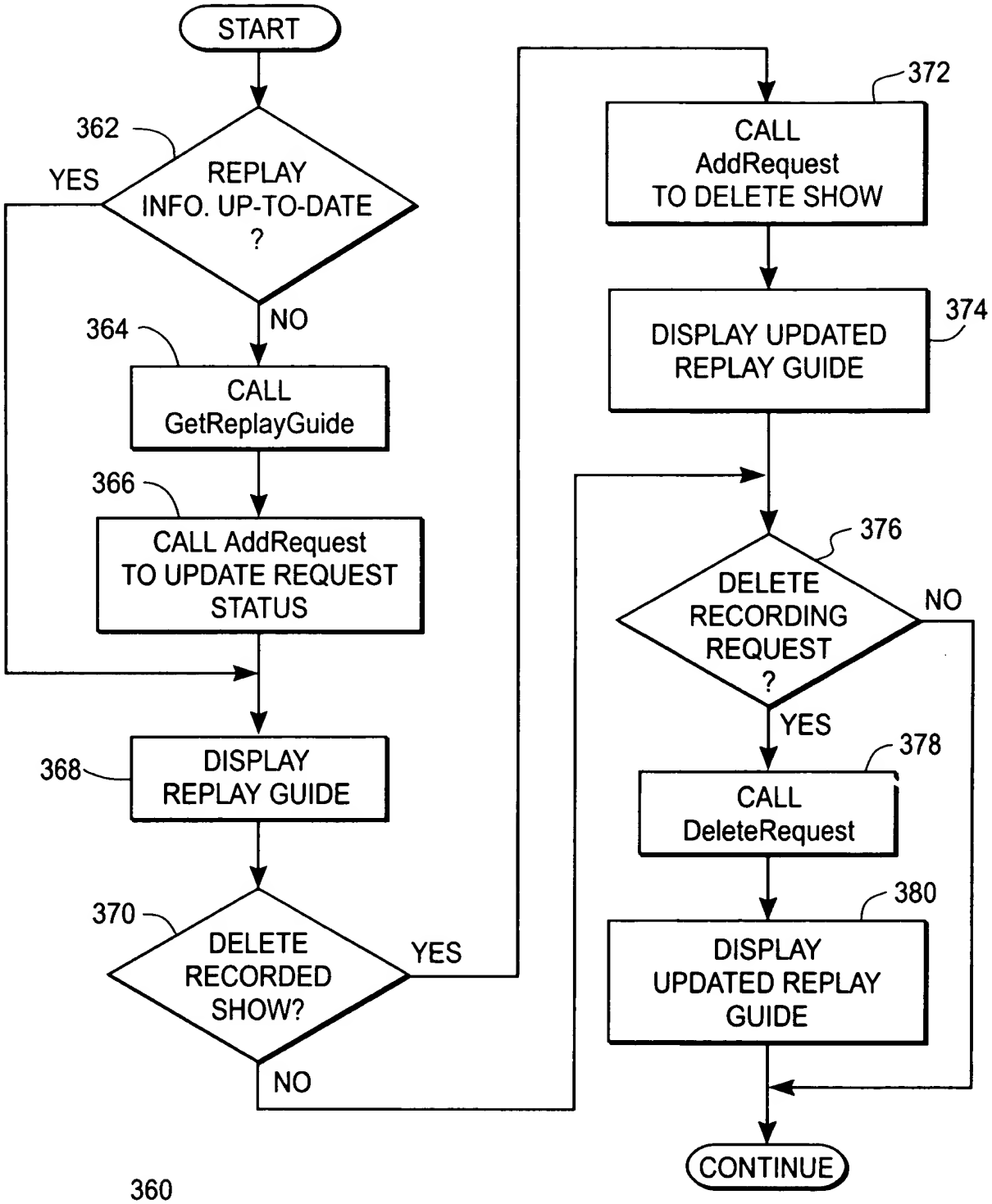

START
362
REPLAY INFO. UP-TO-DATE ?
YES
NO
364
CALL GetReplayGuide
366
CALL AddRequest TO UPDATE REQUEST STATUS
368
DISPLAY REPLAY GUIDE
370
DELETE RECORDED SHOW?
YES
NO
372
CALL AddRequest TO DELETE SHOW
374
DISPLAY UPDATED REPLAY GUIDE
376
DELETE RECORDING REQUEST ?
NO
YES
378
CALL DeleteRequest
380
DISPLAY UPDATED REPLAY GUIDE
CONTINUE
360

FIG. 20

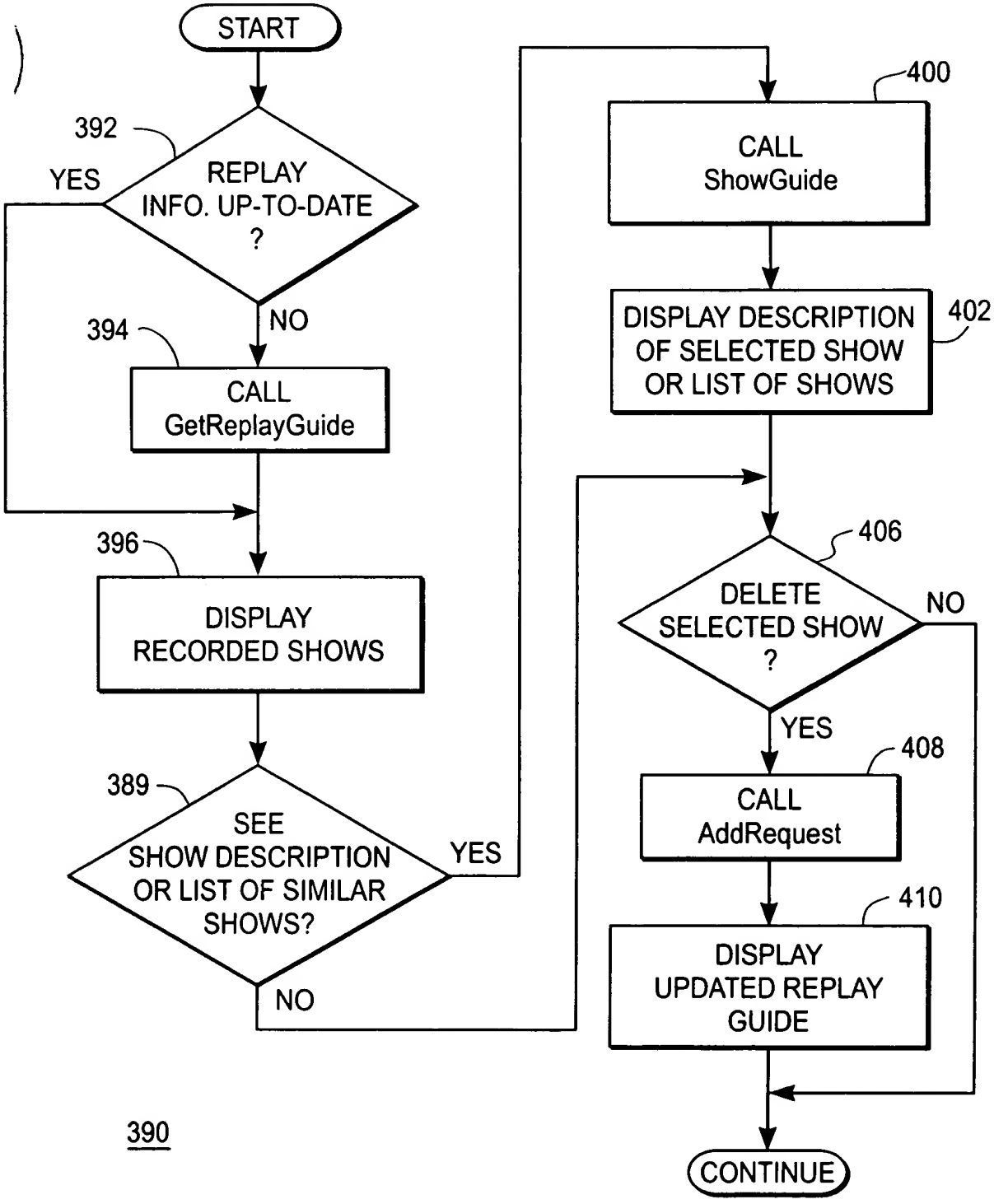

START
392
REPLAY INFO. UP-TO-DATE ?
YES
NO
394
CALL GetReplayGuide
396
DISPLAY RECORDED SHOWS
389
SEE SHOW DESCRIPTION OR LIST OF SIMILAR SHOWS?
YES
NO
400
CALL ShowGuide
DISPLAY DESCRIPTION OF SELECTED SHOW OR LIST OF SHOWS
402
406
DELETE SELECTED SHOW ?
NO
YES
408
CALL AddRequest
410
DISPLAY UPDATED REPLAY GUIDE
CONTINUE
390

FIG. 21

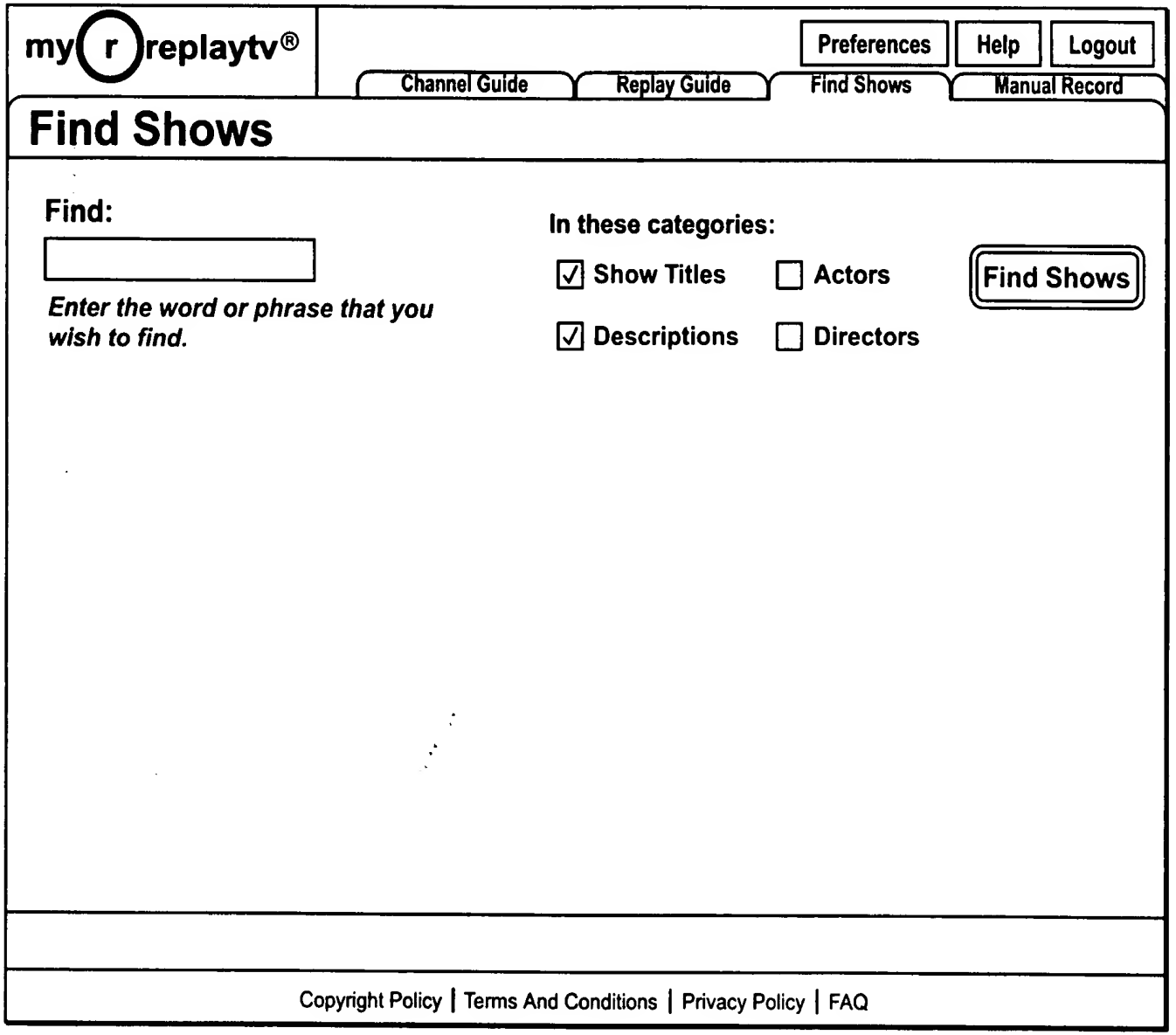


FIG. 22

Title: One Click Web Records
Applicants: Chris E. Matichuk and Scott A. Rosenberg
Docket No.: 22407-05676US

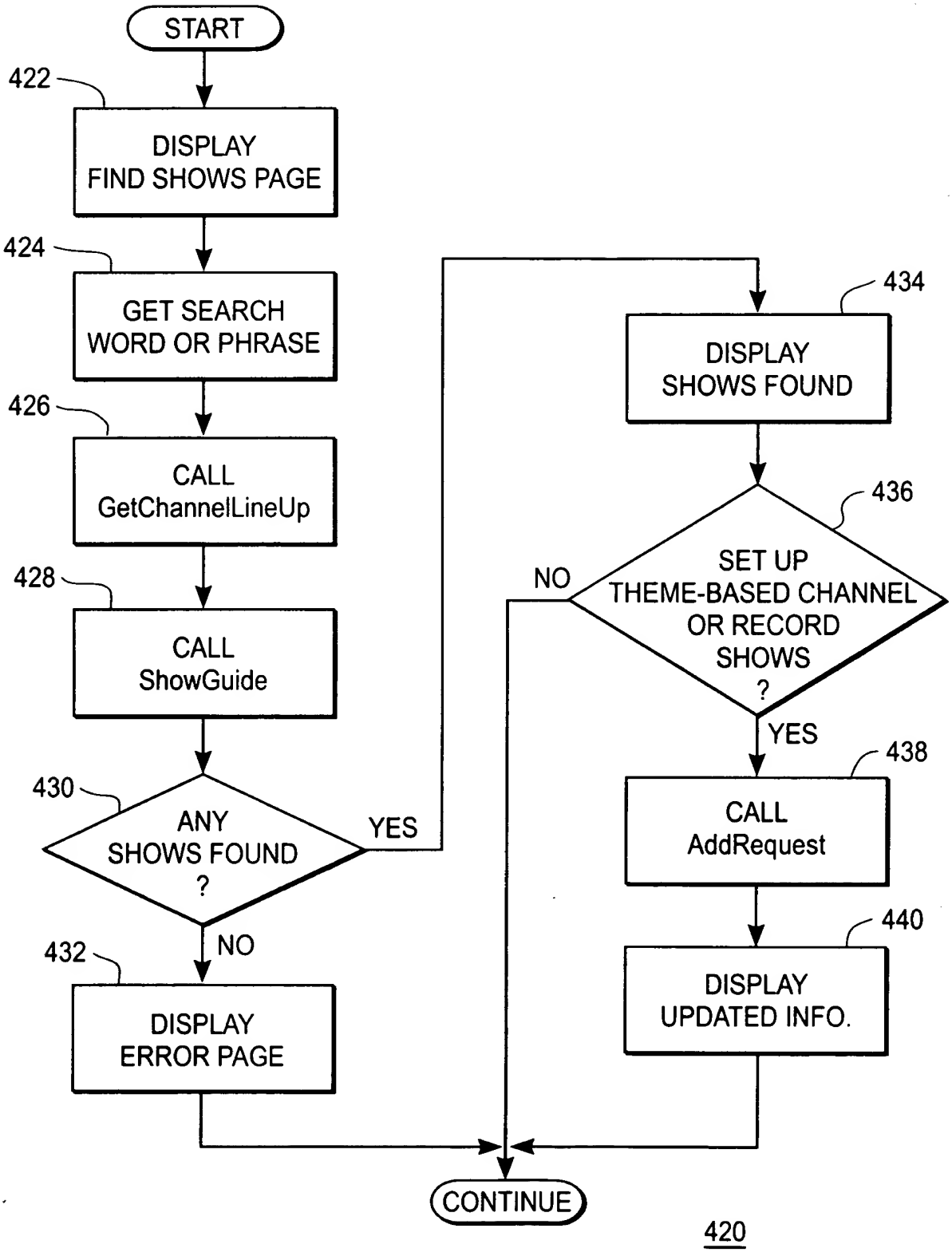

START
422
DISPLAY FIND SHOWS PAGE
424
GET SEARCH WORD OR PHRASE
426
CALL GetChannelLineUp
428
CALL ShowGuide
430
ANY SHOWS FOUND ?
YES
NO
432
DISPLAY ERROR PAGE
434
DISPLAY SHOWS FOUND
436
SET UP THEME-BASED CHANNEL OR RECORD SHOWS ?
NO
YES
438
CALL AddRequest
440
DISPLAY UPDATED INFO.
CONTINUE
420

FIG. 23

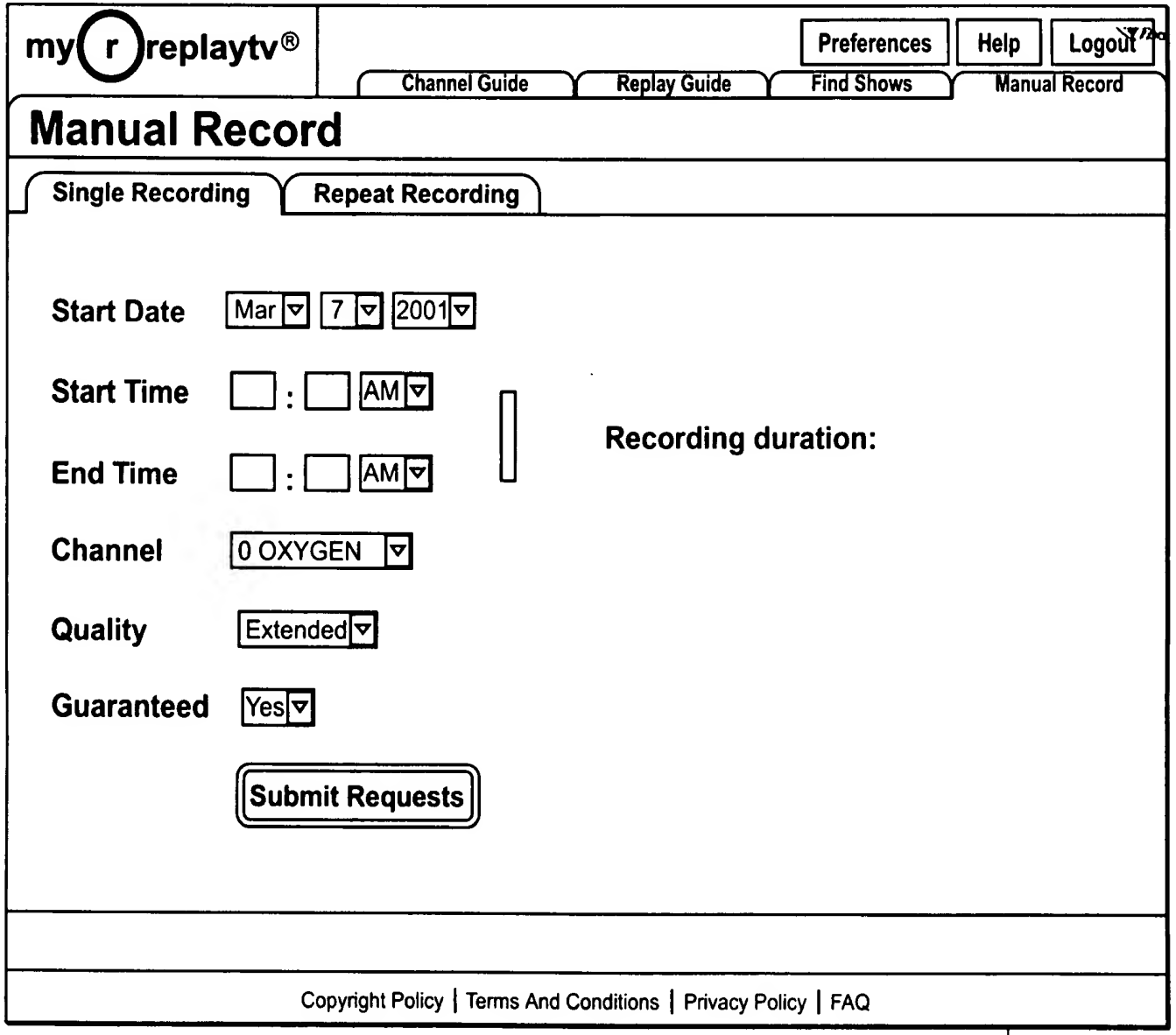


FIG. 24A

Title: One Click Web Records
Applicants: Chris E. Matichuk and Scott A. Rosenberg
Docket No.: 22407-05676US

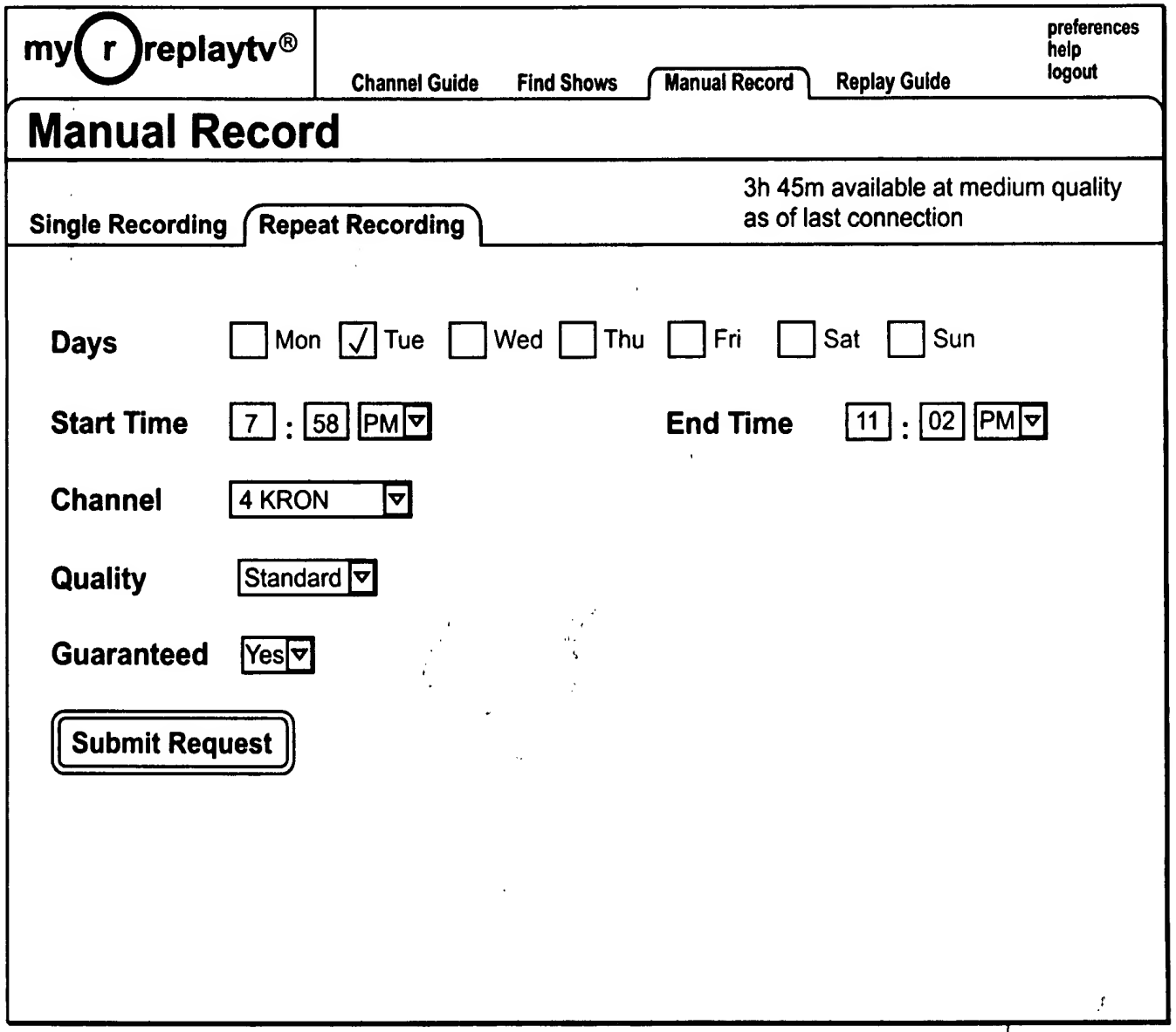


FIG. 24B

Title: One Click Web Records
Applicants: Chris E. Matichuk and Scott A. Rosenberg
Docket No.: 22407-05676US

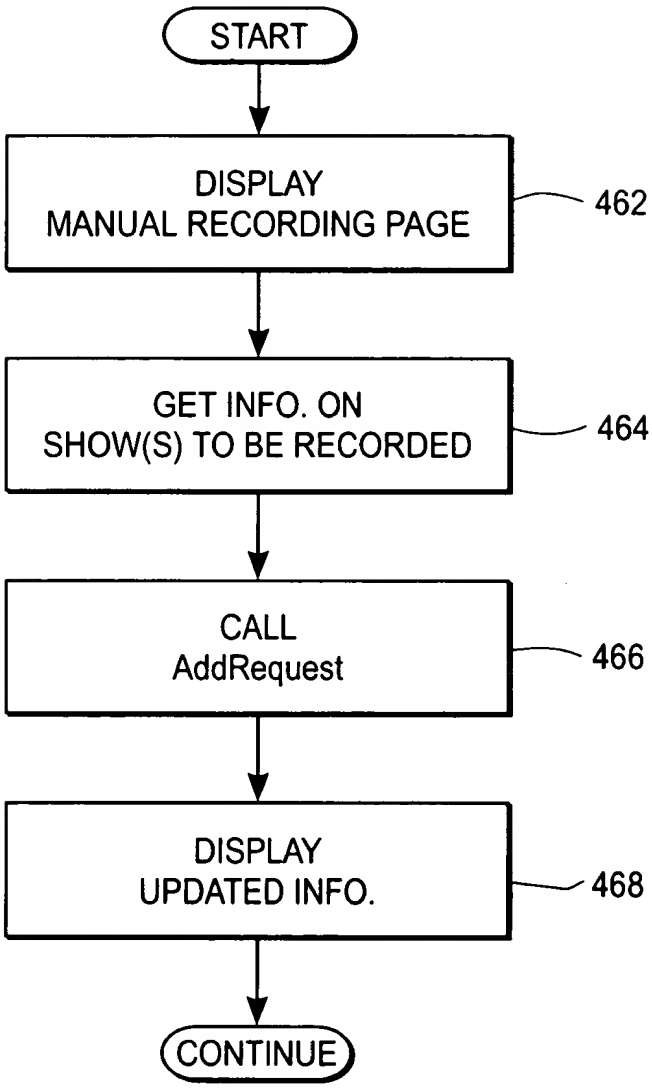

START
DISPLAY MANUAL RECORDING PAGE
462
GET INFO. ON SHOW(S) TO BE RECORDED
464
CALL AddRequest
466
DISPLAY UPDATED INFO.
468
CONTINUE
460

FIG. 25

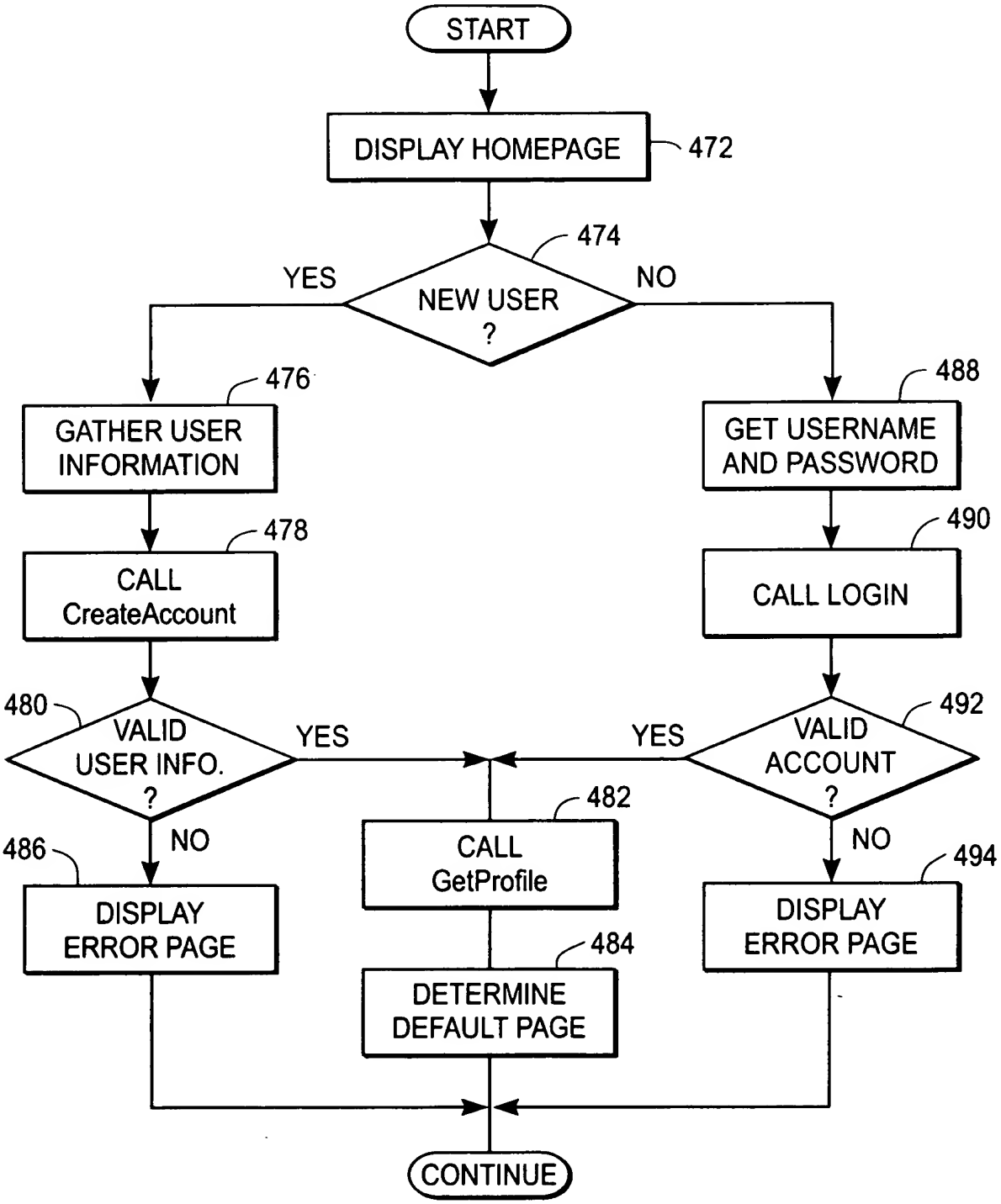

START
DISPLAY HOMEPAGE
472
474
NEW USER ?
YES
NO
476
GATHER USER INFORMATION
478
CALL CreateAccount
480
VALID USER INFO. ?
YES
NO
486
DISPLAY ERROR PAGE
488
GET USERNAME AND PASSWORD
490
CALL LOGIN
492
VALID ACCOUNT ?
YES
NO
494
DISPLAY ERROR PAGE
482
CALL GetProfile
484
DETERMINE DEFAULT PAGE
CONTINUE
470

FIG. 26

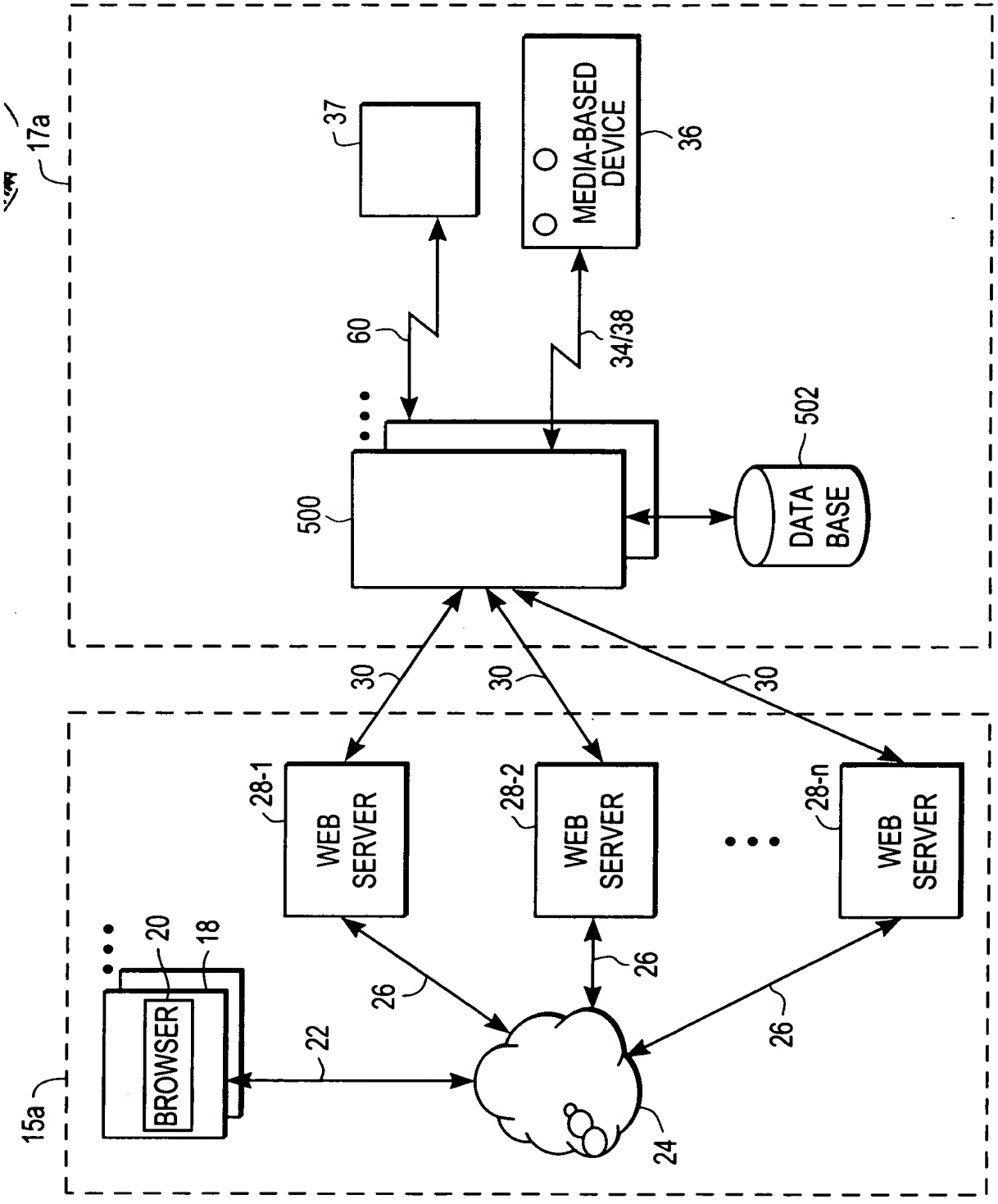

17a
37
MEDIA-BASED DEVICE
36
60
34/38
500
502
DATA BASE
19A
30
30
30
28-1
WEB SERVER
28-2
WEB SERVER
28-n
WEB SERVER
20
18
BROWSER
26
26
26
22
24
15a

FIG. 27

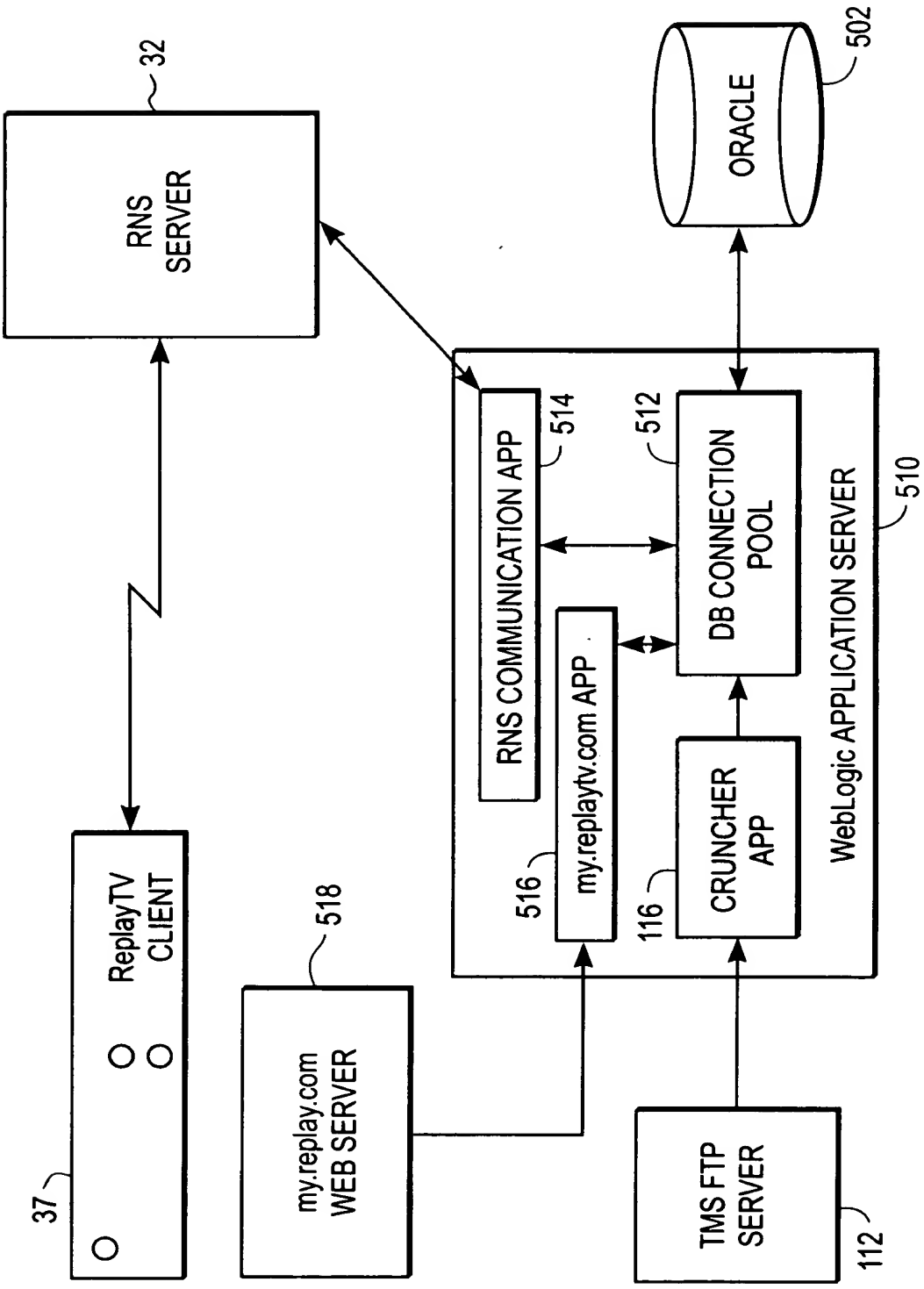

32
RNS SERVER
ORACLE
502
RNS COMMUNICATION APP
514
512
DB CONNECTION POOL
510
WebLogic APPLICATION SERVER
my.replaytv.com APP
516
CRUNCHER APP
116
ReplayTV CLIENT
37
518
my.replay.com WEB SERVER
TMS FTP SERVER
112

FIG. 28

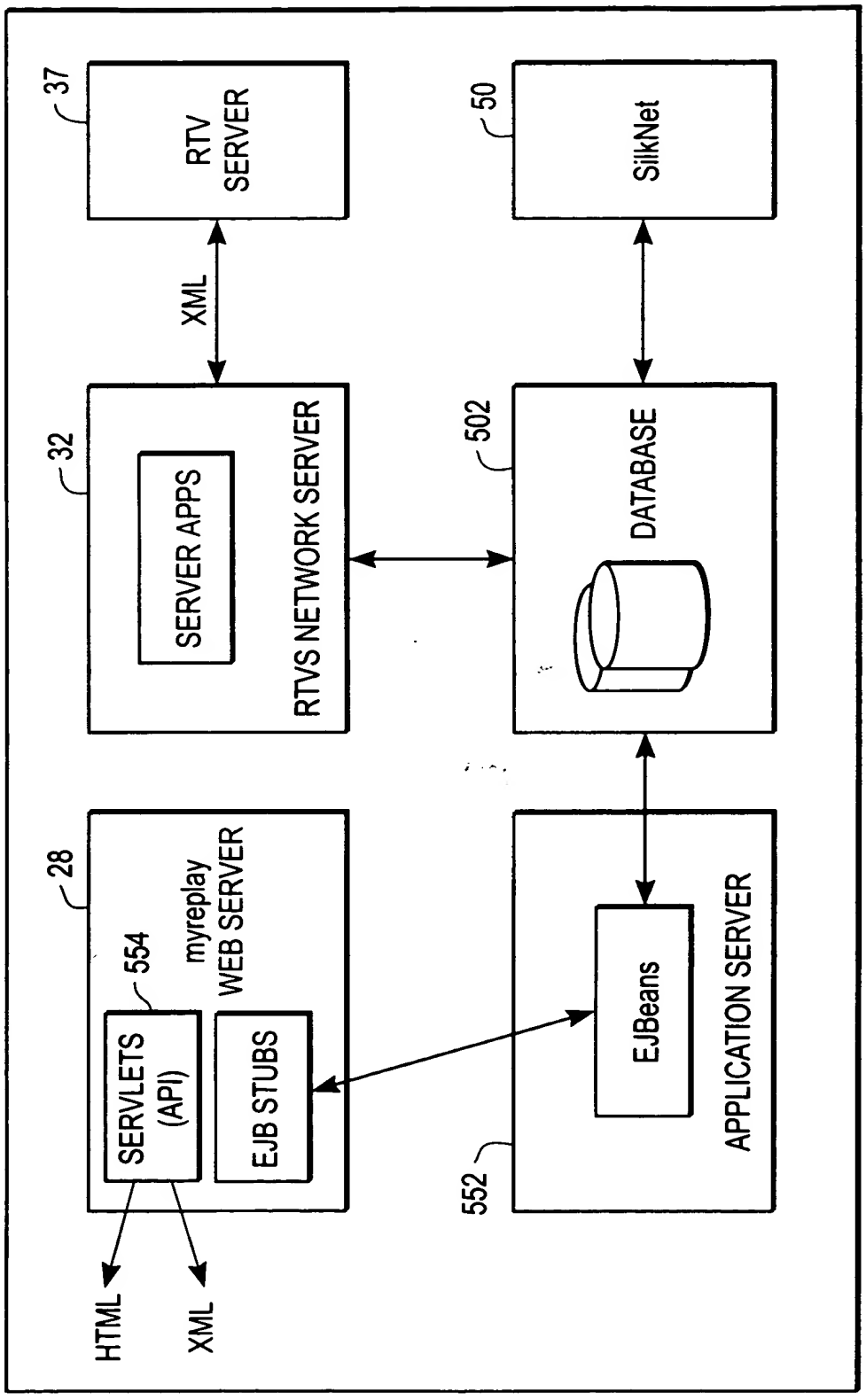

37
RTV SERVER
50
SilkNet
XML
32
SERVER APPS
RTVS NETWORK SERVER
502
DATABASE
28
554
myreplay WEB SERVER
SERVLETS (API)
EJB STUBS
EJBeans
APPLICATION SERVER
552
HTML
XML
550

FIG. 29

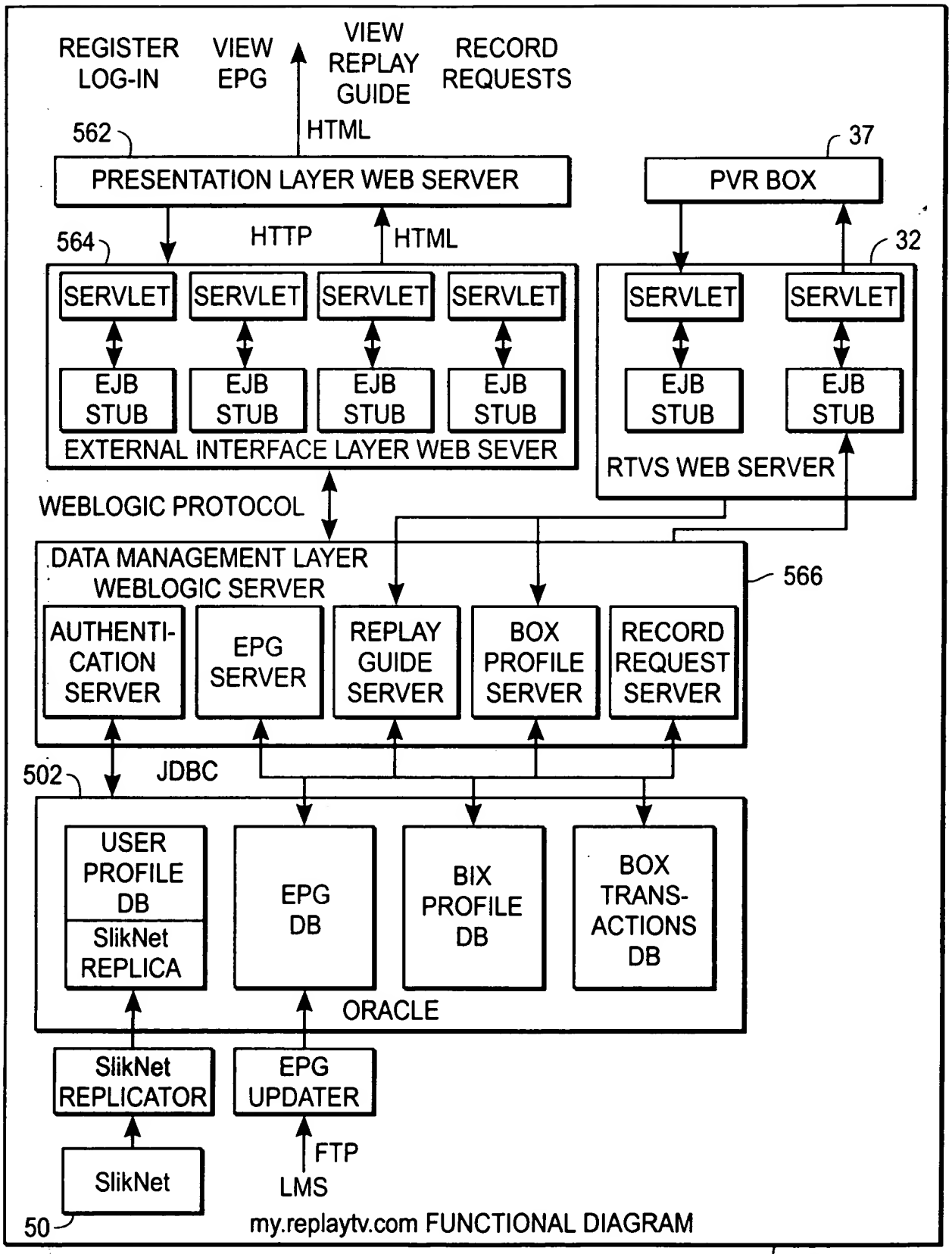

REGISTER LOG-IN
VIEW EPG
VIEW REPLAY GUIDE
RECORD REQUESTS
HTML
562
PRESENTATION LAYER WEB SERVER
37
PVR BOX
564
HTTP
HTML
32
SERVLET
SERVLET
SERVLET
SERVLET
SERVLET
SERVLET
EJB STUB
EJB STUB
EJB STUB
EJB STUB
EJB STUB
EJB STUB
EXTERNAL INTERFACE LAYER WEB SEVER
RTVS WEB SERVER
WEBLOGIC PROTOCOL
DATA MANAGEMENT LAYER WEBLOGIC SERVER
566
AUTHENTI-CATION SERVER
EPG SERVER
REPLAY GUIDE SERVER
BOX PROFILE SERVER
RECORD REQUEST SERVER
502
JDBC
USER PROFILE DB
SlikNet REPLICA
EPG DB
BIX PROFILE DB
BOX TRANS-ACTIONS DB
ORACLE
SlikNet REPLICATOR
EPG UPDATER
FTP
SlikNet
LMS
50
my.replaytv.com FUNCTIONAL DIAGRAM
560

FIG. 30

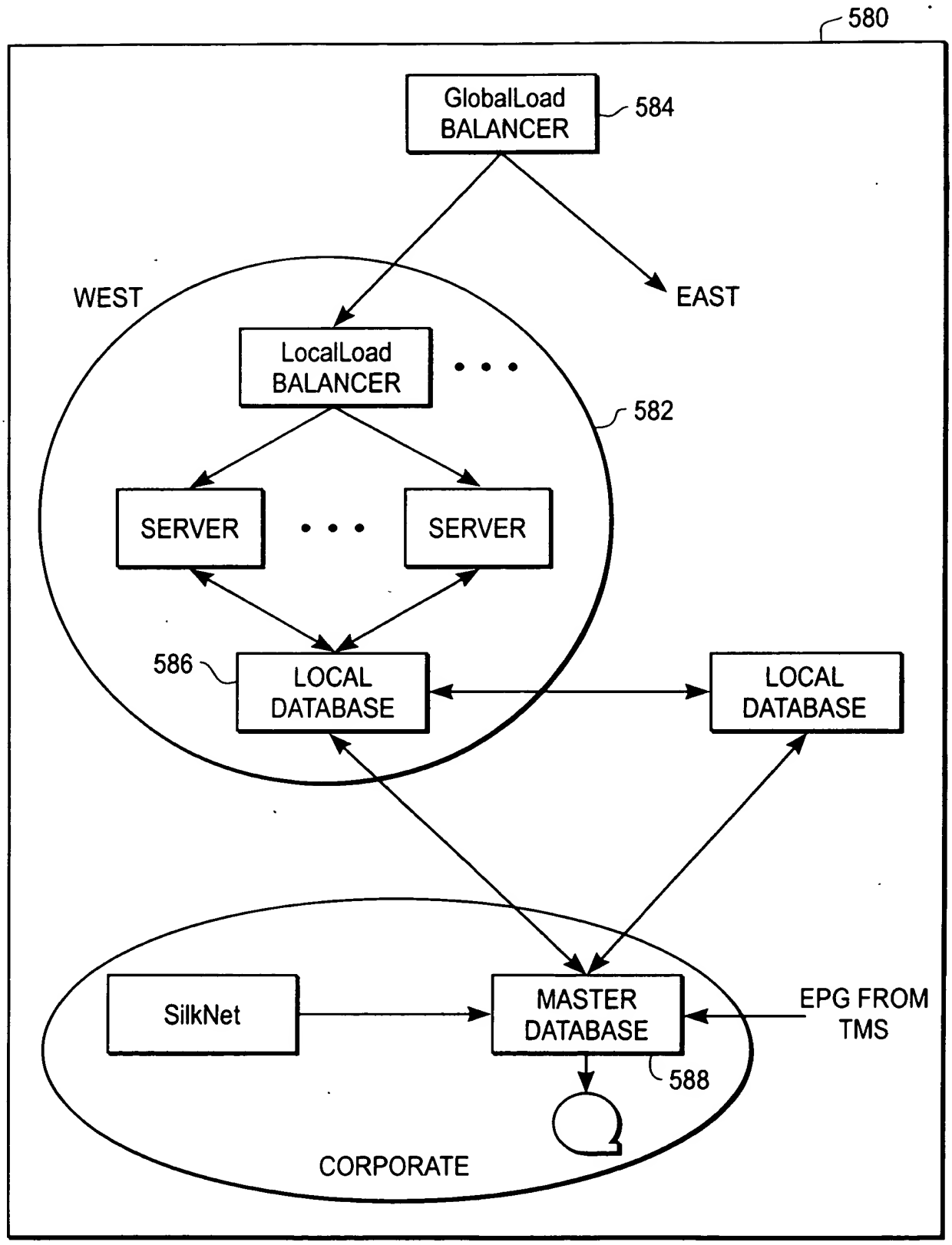

580
GlobalLoad BALANCER
584
WEST
EAST
LocalLoad BALANCER
582
SERVER
SERVER
586
LOCAL DATABASE
LOCAL DATABASE
SilkNet
MASTER DATABASE
EPG FROM TMS
588
CORPORATE

FIG. 31

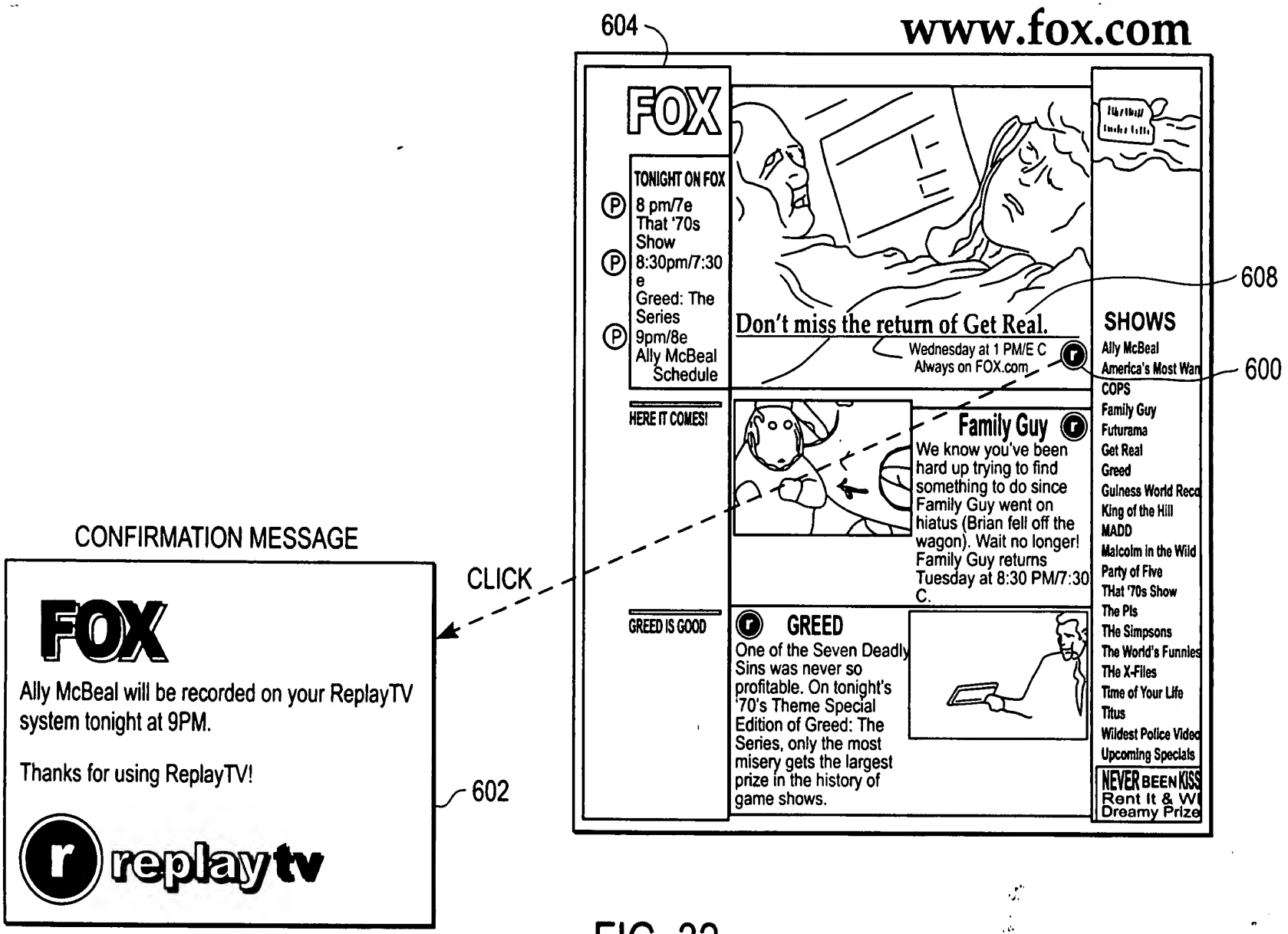


FIG. 32

Title: One Click Web Records
Applicants: Chris E. Matichuk and Scott A. Rosenberg
Docket No.: 22407-05676US

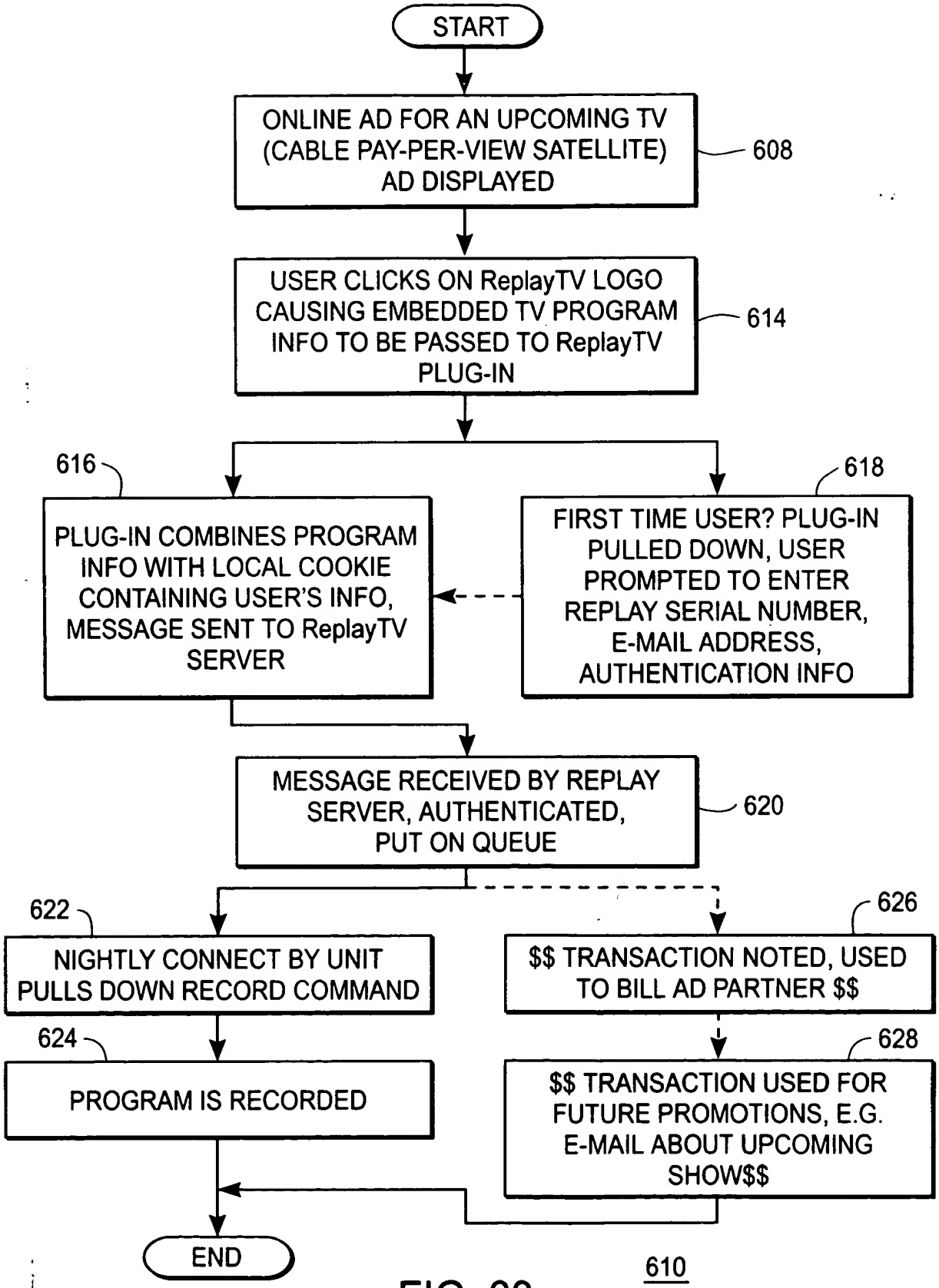

START
ONLINE AD FOR AN UPCOMING TV (CABLE PAY-PER-VIEW SATELLITE) AD DISPLAYED
608
USER CLICKS ON ReplayTV LOGO CAUSING EMBEDDED TV PROGRAM INFO TO BE PASSED TO ReplayTV PLUG-IN
614
616
PLUG-IN COMBINES PROGRAM INFO WITH LOCAL COOKIE CONTAINING USER'S INFO, MESSAGE SENT TO ReplayTV SERVER
618
FIRST TIME USER? PLUG-IN PULLED DOWN, USER PROMPTED TO ENTER REPLAY SERIAL NUMBER, E-MAIL ADDRESS, AUTHENTICATION INFO
MESSAGE RECEIVED BY REPLAY SERVER, AUTHENTICATED, PUT ON QUEUE
620
622
NIGHTLY CONNECT BY UNIT PULLS DOWN RECORD COMMAND
626
$$ TRANSACTION NOTED, USED TO BILL AD PARTNER $$
624
PROGRAM IS RECORDED
628
$$ TRANSACTION USED FOR FUTURE PROMOTIONS, E.G. E-MAIL ABOUT UPCOMING SHOW$$
END
610

FIG. 33